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LAND USE IN DURHAM COUNTY, ONTARIO (HOPE AND CLARKE TOWNSHIPS)

chgs.
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MARKETING SERVICE • ECONOMICS DIVISION



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LAND USE IN DURHAM COUNTY, ONTARIO

(HOPE AND CLARKE TOWNSHIPS)

INTRODUCTION

Soil erosion, loss of soil fertility, lowering of water tables and the problems related thereto have become important issues in many parts of Eastern Canada. They have been accompanied by an increase in farm expenditures, reduced income and in many instances, abandoned land. Persons familiar with agriculture have known of these conditions for some time and steps have been taken to deal with some of them. Their solution, however, involves a great deal more consideration on the part of the people and their government than has thus far been accorded them.

In some instances, perhaps many, the solution will involve a comprehensive program of conservation. Such a program will call for improvements in the technique of farming. It may include reforestation and the use of land for other than agricultural purposes. It may also include flood control and the protection of streams and water sources. Where such a development is necessary it will call for the co-operation of several agencies and the integration of activities in various fields. The formulation of such a program will require more detailed information, both with respect to agriculture, and to other aspects of the problem, than has hitherto been available.

Early in 1941 representatives of various associations concerned with agriculture, forestry and wild life met at Guelph, Ontario, to consider the problem of conservation. The discussion led to the conclusion that a study should be made of a problem area--one in which the various destructive forces are at work, also, that based upon such a study, recommendations for a conservation program applicable to this and other similar areas, should be made. It was also suggested that the development of such a program in the immediate post-war years might prove useful as a rehabilitation and employment measure and that the possibilities in this connection should be considered.

Subsequently, an appeal for assistance in making such a study was made to the Dominion Government through the Advisory Committee on Reconstruction, and to the Ontario Government through the Premier of the province. The appeal was successful, financial support being promised in each instance. The Ontario Government also appointed an Interdepartmental Committee headed by Mr. A. H. Richardson to organize and supervise the study.

The area selected for study was the Ganaraska River Valley in Durham County. The field work, which was initiated in the summer of 1942, included special surveys of soil resources, land use and economic conditions. Information added later dealt with the history of the area,--the cutting of the forests and the loss of wild life, the clearing of land and establishment of farms, the growth and decline of local industry, the development of urban centres and finally the loss of soil fertility and destruction of property caused by recurrent flooding of the Ganaraska River. The various phases of the study were then combined and published under the title "The Ganaraska

Watershed" ^{1/}. The report includes recommendations for a comprehensive program of rehabilitation and conservation.

Included in the Ganaraska report is a section entitled "Economic Aspects of Agriculture". The information presented in this section is based upon records obtained by the Dominion Economics Division from 49 farmers located wholly or partly in a section of the Watershed that was considered suitable for development as a forest area.

Farm business records were also obtained from other farmers, 257 in all, including those in the proposed forest area. The information derived from these records together with statistics obtained from the Dominion Bureau of Statistics and from the officials of Hope and Clarke Townships, is presented in this more extended report.

The material presented in the following pages is divided roughly into two main parts--the first dealing with the Economic Aspects of Agriculture in the Ganaraska Watershed, and the second dealing with Land Classification in Hope and Clarke Townships. The first part of the study compares the type of farming carried on in Ganaraska Watershed with those forty-nine farms located within the proposed Forest Area.

The second phase of the study deals entirely with Land Classification and for the first time an attempt has been made to work out a land classification pattern in Eastern Canada based on potential land use. In a report on "Materials and Techniques of Modern Land Classification in 1940" ^{2/}, John J. Haggerty and Alva M. Meyers of the United States Department of Agriculture said that "there are as many kinds of land classification as there are interests in land". In this same report they deal with the type of classification that has been attempted in this study and they define it as "general land classification, or more properly, land classification as a general guide to the planning of land use". They go on to state that, "this definition is not intended to imply that a precise pattern and system of land use would be formulated for any land area at any particular time, but rather, that the general direction of adjustment would indicate towards which all land use programs, public or private, might be guided to such an extent and at such rates as the conditions and limitations under which they severally operate may permit."

In the Prairie Provinces, land classification work has been underway for a number of years and is based on the ability of land to produce returns from wheat. In Eastern Canada, no one crop or enterprise predominates and thus a land classification had to be developed using as a basis the returns from the type of farming most prevalent in the area under study.

^{1/} The Ganaraska Watershed: A. H. Richardson, published jointly by the Dominion and Ontario Governments; the King's Printer, Toronto, Ontario, 1944.

^{2/} John J. Haggerty and Alva M. J. Meyers, United States Department of Agriculture, Bureau of Agricultural Economics, Mimeographed Report. Address prepared for National Conference on Land Classification, Columbia, Missouri, 1940.

AGRICULTURAL DEVELOPMENT IN DURHAM COUNTY

General

The Ganaraska River Valley and the surrounding districts present many problems characteristic of wide areas in the Province of Ontario. This river, and its tributaries, rise in the upper parts of Hope and Clarke Townships in Durham County and flow through both of these townships and the main stream empties into Lake Ontario at Port Hope. The historical background of life in this area has been dealt with at great length in "The Ganaraska Watershed" ^{1/}, so no further mention will be made, at this time, of any phase except that dealing with agriculture in the areas. It is assumed, for purpose of analysis, that the trends with respect to agriculture that have taken place in the whole of Durham County during the past 80 years are indicative of changes that have taken place in the two townships of Hope and Clarke.

Population Changes

Durham County is divided into six townships, Cartwright, Cavan, Clarke, Darlington, Hope and Manvers. To obtain the total population of the county, it is necessary, in addition to the population of these six townships, to include the population of four towns, namely Bowmanville, Millbrook, Newcastle and Port Hope. Township figures on population are not available prior to 1861 although the total population of Durham County is reported as far back as 1825.

TABLE 1. Population of Durham County, 1825-1941

Year	Population	Year	Population	Year	Population
1825	3,546	1840	18,134	1901	27,570
1826	4,493	1851	30,732	1911	26,411
1828	4,942	1861	39,115	1921	24,629
1832	8,716	1871	37,380	1931	25,782
1834	11,021	1881	36,265	1941	25,215
1836	14,176	1891	32,427		

From 1825 to 1851 the population of Durham increased from 3,546 to more than 30,000 and by 1861 had reached a peak of 39,115 after which time a steady decline took place until 1921. Since 1921 the population has remained practically static. A detailed breakdown by townships and towns is shown in Table 2, and it may be noted that the population of both Hope and Clarke Townships decreased steadily from 1861 to 1941.

In Clarke, the population in 1941 was only 43 per cent of that of 1861, while in Hope Township less than 2,500 persons were reported in 1941 as compared with 5,883 in 1861.

^{1/} "The Ganaraska Watershed". A. H. Richardson, 1944.

TABLE 2. Population ^{1/} by Townships, Durham County, 1861-1941

Year	Bowman-ville	Mil-Cavan	Cart-brook	Clarke-wright	Darling-Clarke	ton Hope	New-Manvers	Portcastle
1861	2,721	4,901	2,727	6,575	6,912	5,883	4,205	1,029
1871	3,034	4,761	2,514	5,728	5,931	5,075	4,114	1,109
1881	3,504	3,479	1,148	2,357	5,069	5,465	4,522	2,976
1891	3,377	3,106	971	2,026	4,427	4,757	3,887	4,047
1901	2,731	2,729	917	1,768	3,788	4,174	3,273	3,357
1911	2,814	2,499	793	1,584	3,375	3,682	3,115	2,802
1921	3,233	2,188	717	1,399	3,039	3,780	2,754	2,504
1931	4,080	2,106	663	1,395	2,924	3,915	2,776	2,490
1941	4,113	1,844	742	1,273	2,814	4,159	2,494	1,970

^{1/} Sources: Census of Canada, Volume 1 in Census Reports 1861 to 1931 and preliminary releases of Census of Population 1941.

Changes in Land Use

TABLE 3. Number of Farms in Hope and Clarke Townships and Durham County from 1861 to 1881 and 1911 to 1941

Year	Hope no.	Clarke no.	Total Durham County no.
1861	621	655	3,386
1871	692	713	3,735
1881	732	699	3,984
1911	(1)	(1)	3,648
1921	(1)	(1)	3,130
1931	599	490	3,230
1941	464	526	2,769

(1) Not shown separately by townships.

The number of farms in Hope and Clarke Townships decreased substantially from 1861 to 1941 (Table 3) but not to the same extent as the farm population. Between 1911 and 1941 the number of farms in Durham County decreased from 3,648 to 2,769. This was, in the main, a period of expansion and of a rapidly developing commercialized agriculture. In the competition that resulted many farmers lost out while those who remained, enlarged their holdings to make more effective use of the new types of machinery that became available (Table 4).

In this 30-year period, the number of farm holdings, of less than 4 acres, declined from 484 to 60. A similar marked decline was evident in all other size groups under 100 acres but in the size group 100 to 200 acres, there was only a slight decrease. Farms of over 200 acres, on the other hand, increased steadily from 208 in 1911 to 226 in 1921, to 265 in 1931 and 326 in 1941.

TABLE 4. Number of Farms in Each Size Group in Durham County, 1911 - 1941

Size of Farm	1911	1921	1931	1941
	no.	no.	no.	no.
1 - 4 acres	484	151	162	60
5 - 10 "	176	137	152	106
11 - 50 "	451	394	484	337
51 - 100 "	1,250	1,142	1,113	917
101 - 200 "	1,079	1,080	1,054	1,023
Over 200 "	208	226	265	326
TOTAL	3,648	3,130	3,230	2,769

The utilization of land in Durham County changed considerably during the period 1861 - 1941 (Table 5). The census of 1861 reported 329,800 acres of occupied land of which slightly more than 205,000 acres were classified as improved land. Of the improved land, 129,398 acres were in crops while 75,709 acres were improved pasture. From 1861 to 1891 the number of acres of improved as well as total occupied land continued to expand. During this period, farms were increasing in size and census figures show that in this latter year, 364,103 acres were occupied in Durham County and of this total 302,509 acres were improved land.

TABLE 5. Utilization of Land, Durham County, 1861 - 1941

Year	Occupied land acres	Improved land acres	Crop land acres	Pasture land acres	Forest land acres
1861	329,800	205,107	129,398	75,709	(2)
1871	345,132	243,573	194,913	43,521	(2)
1881	355,874	274,413	224,525	43,236	(2)
1891	364,103	302,509	253,460	49,049	61,594
1901	360,490	280,618	213,243	87,301 (1)	43,782
1911	362,660	273,143	210,357	(2)	38,293
1921	357,051	248,121	176,517	35,385	42,396
1931	363,367	248,311	173,705	57,872	48,303
1941	352,616	238,520	160,162	62,368	43,139
% Change					
1941 - 1911	-2.8	-12.7	-23.9	+76.7 (3)	+12.7

(1) Includes unimproved pasture.

(2) Not available.

(3) Per cent change 1941-1921.

While the occupied land in Durham County decreased by 2.8 per cent from 1911 to 1941, the acreage in improved land decreased 12.7 per cent, and the acreage in crop land decreased 23.9 per cent. This is evidence that a great deal of land improved and cropped in 1911 was considered unprofitable or submarginal for crop production in succeeding years. In contrast the acreage in forest land increased 12.7 per cent, as land once thought suitable for agriculture was returned to its native state. At the same time the acreage in pasture land was increased to 62,368 acres in 1941 or 76 per cent more than the 1921 total.

TABLE 6. Amount of Occupied Land, Crop Land and Forest Land
In Hope and Clarke Townships, 1911 - 1941

	1911	1921	1931	1941	Percent Change
	acres	acres	acres	acres	%
Occupied land	127,466	125,235	127,691	124,758	- 2.1
Crop land	76,311	62,993	62,593	55,786	-26.9
Forest land	11,696	12,635	14,996	14,352	+22.7

In Table 6 the amount of occupied land, crop land and forest land in Hope and Clarke Townships from 1911 to 1941 is shown and the same trend is evident here as was noted for the whole of Durham County.

Changes in Crop Production

While it is true that cropping practices in any particular year are influenced by probable markets and climatic conditions, the figures on acreage and yields (Table 7) show that major changes in types of farming have taken place in Durham County since 1860.

Wheat.

While the acreage of wheat reported in Durham County in 1940 was 19 per cent higher than in 1910, it represented only about 20 per cent of the amount sown to wheat in 1860. The average yield of wheat had increased to 26.3 bushels per acre in 1940 as compared with 20.3 bushels in 1910 and 17.6 bushels in 1860.

Oats and Mixed Grain.

In 1860, approximately 25,000 acres of oats and mixed grain were grown in Durham County and gave a yield of almost 700,000 bushels. By 1900, this production had increased to 1.7 million bushels and by 1940 had further increased to almost 2 1/4 million bushels. The acreage of oats and mixed grain totalled 67,489 acres in 1940 and represented 42.1 per cent of the total acreage in crop land.

TABLE 7. Changes in Cropping Practices, Durham County, 1860 to 1940

Year	Potatoes:	Turnips:	Buck-:	Hay:	Wheat:	Oats and:	Barley:	Rye:	Beans:	Corn:
	Swedes:		wheat:			mixed:			and:	
						grain:			Peas:	
1860 acres	4,359	2,414	183	-	62,878	24,245	1,419	683	13,764	739
1860 bu.	480,784	860,043	3,749	16,980 tons	1,107,971	691,724	39,919	10,618	286,576	21,307
1870 acres	4,545	(1)	(1)	34,691	50,334	(1)	(1)	(1)	(1)	-
1870 bu.	496,328	1,629,348	5,294	38,107 tons	301,462	562,292	348,904	25,920	211,654	22,148
1880 acres	3,710	(1)	(1)	30,623	55,725	-	(1)	(1)	(1)	-
1880 bu.	470,787	1,866,053	9,490	36,248 tons	596,539	934,802	783,948	47,406	400,824	50,468
1890 acres	3,792	5,510	(1)	41,825	40,669	-	40,190	(1)	(1)	-
1890 bu.	346,570	2,342,065	70,305	60,307 tons	455,518	908,032	719,451	46,698	349,671	72,824
1900 acres	3,120	6,450	2,456	41,561	31,240	55,093	23,643	13,926	24,757	1,445
1900 bu.	349,320	1,882,754	27,271	40,840 tons	590,628	1,736,530	667,247	170,770	511,609	78,683
1910 acres	2,789	3,442	8,546	50,314	11,290	71,538	10,955	9,022	18,911	725
1910 bu.	301,566	1,581,495	182,867	66,138 tons	230,164	1,994,289	79,760	103,740	188,069	46,556
1920 acres	2,925	2,120	4,379	43,118	15,647	65,281	4,238	8,012	6,887	221
1920 bu.	332,961	817,689	68,978	46,730 tons	262,691	2,078,708	119,212	112,956	114,893	10,445
1930 acres	3,161	1,368	9,134	50,445	9,779	65,641	8,238	3,840	4,876	252
1930 bu.	356,051	515,936	160,071	70,914 tons	227,752	2,052,450	223,011	43,374	84,194	11,165
1940 acres	2,691	985	4,474	50,870	13,390	67,489	5,018	7,364	2,189	43
1940 bu.	223,545	432,703	74,490	81,291 tons	352,593	2,244,874	132,066	101,051	28,130	1,115

(1) Not available.

Barley.

In 1860, 1,419 acres of barley were reported in Durham County, yielding 39,919 bushels. During the next 20 years this crop expanded rapidly and in 1880 and 1890 over 700,000 bushels of barley were grown. The total acreage in 1890 was 40,190 acres and this represented approximately 13.0 per cent of the total acreage in improved land for that year. However, since that time barley production has decreased in popularity, and in 1940 only 5,018 acres were planted, yielding 132,066 bushels.

Rye.

In 1940, rye was grown quite extensively in Durham County, probably due to the fact that large areas of land were not suitable for intensive grain crops. However, production of this crop in 1900 was higher than was shown in 1940.

Beans and Peas.

Bean and pea production was very important in the economy of the pioneer settlers, and in 1860 the total acreage planted to these crops was 13,764 acres, yielding almost 300,000 bushels. By 1900 the area in beans and peas had increased to almost 25,000 acres with a corresponding increase in production, but since the turn of the century, acreage and production have been steadily decreasing and in 1940, only 28,130 bushels were produced..

Corn, husking.

While corn for husking has never been an important crop from the point of view of total acreage, it was, nevertheless, an important item in the diet of the pioneer farmer. In 1900, a total of 1,445 acres of corn were reported, yielding 78,683 bushels. Since that time, this crop has decreased steadily and in 1940 only 43 acres were reported.

Potatoes.

In 1870, the acreage of potatoes in Durham County was 4,545, yielding approximately a one-half million bushel crop. Since that time, however, production has gradually but steadily declined until in 1940 the total production of potatoes was slightly less than one-quarter of a million bushels.

Turnips and Swedes.

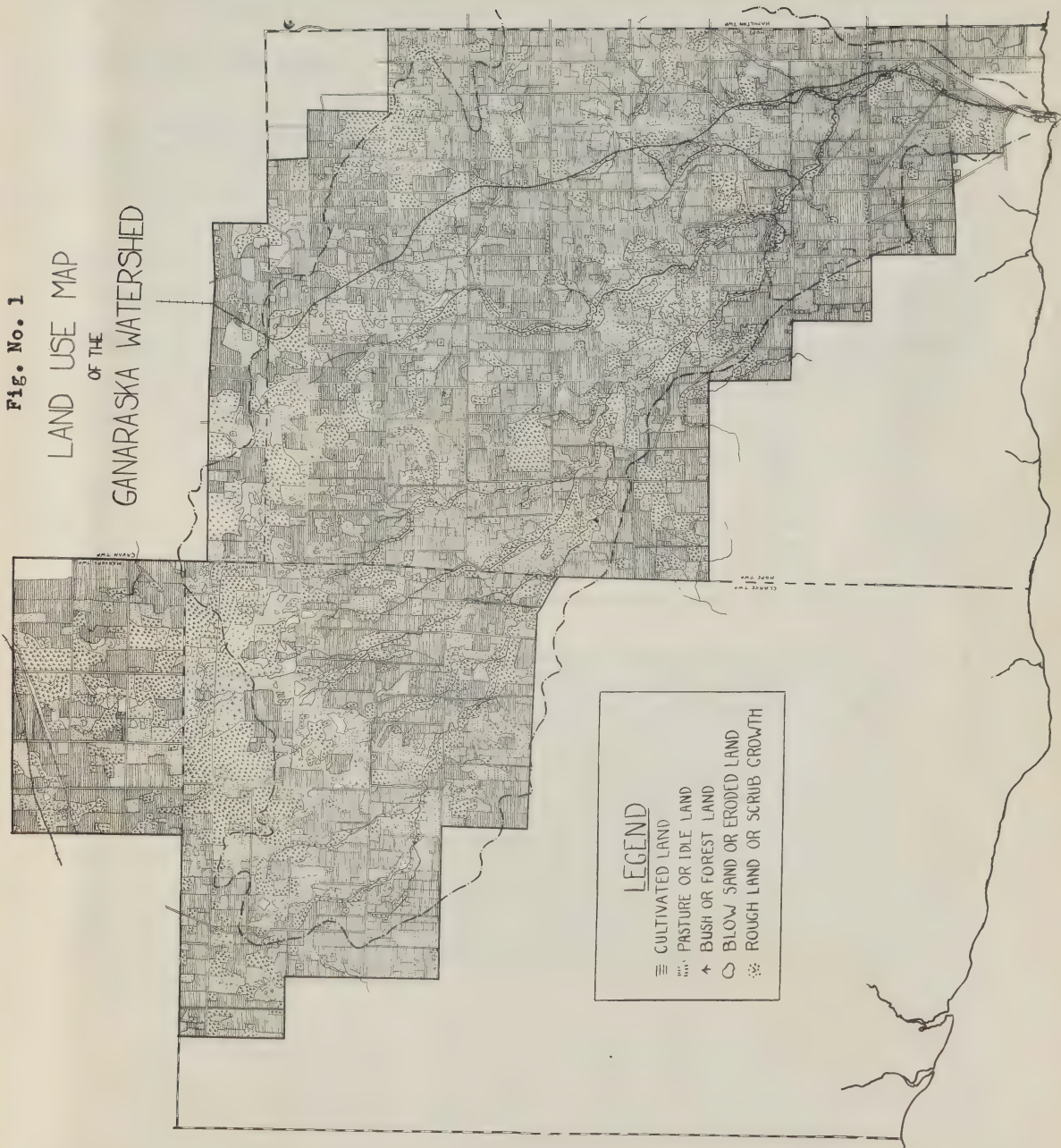
In 1900, approximately 6,500 acres in Durham County were planted to turnips as compared with 2,400 acres forty years previously. However, since 1900 this crop has rapidly decreased in popularity and in 1940 less than 1,000 acres were planted, yielding less than half a million bushels.

Hay, cultivated.

Production of hay in Durham County has increased steadily from 1860 when production was reported as 16,980 tons, to 1940 when more than 81,000 tons were harvested. The increase in the last 30 years is due to higher acreage yields as well as increased acreage.

Fig. No. 1

LAND USE MAP
OF THE
GANARASKA WATERSHED



Forage Crops.

In 1940, 6,233 acres of forage crops were reported in the county as compared with 4,375 in 1910, 8,958 in 1920 and 5,267 in 1930.

Clover and Grass Seed.

In 1910, over 1 million pounds of clover seed and 23,000 pounds of grass seed were harvested. In 1940, however, only 289,000 pounds of clover seed were harvested although grass seed for this same year totalled 42,000 pounds.

Changes in Livestock Enterprises in Durham County

TABLE 8. Changes in Livestock Numbers, Durham County, 1861-1941

Year	Milk cows	Swine	Sheep	Horses	Other cattle	Hens and Chickens
1861	13,112	22,389	38,649	(1)	(1)	(1)
1871	17,444	18,696	37,494	(1)	(1)	(1)
1881	14,018	12,678	24,939	(1)	(1)	(1)
1891	12,758	22,078	18,590	(1)	(1)	(1)
1901	14,909	22,949	22,736	(1)	(1)	(1)
1911	14,847	30,981	18,188	15,212	26,866	259,708
1921	14,436	18,995	20,970	12,481	29,082	300,600
1931	15,931	23,284	26,180	11,188	24,000	466,611
1941	19,799	32,192	18,066	9,963	22,918	346,805

(1) Not available.

Livestock numbers have shown wide variations over the last 80 years with no definite trend being evident. While the census of 1941 reported almost 20,000 milch cows in Durham County, this is only about 13.5 per cent more than was reported for the county in 1870. Similarly, the swine population in 1941 is shown as 32,192 compared with 22,389 in 1861, but only 4 per cent higher than the 30,981 reported in 1911. Sheep, on the other hand, show a fairly definite downward trend and only 18,000 were reported in Durham County in 1941 as compared with 22,736 in 1901 and 38,649 in 1861. As would be expected, the number of horses on farms has been decreasing steadily and while reports are not available prior to 1911, the number on farms in Durham County has decreased 35 per cent during the period 1911-1941. The actual number of hens and chickens reported on farms at the time of the census in 1911 totalled 259,000. This was increased somewhat in 1920 and then sharply increased to 467,000 in 1930. By 1941 the number of hens and chickens on Durham County farms had decreased to 347,000.

ECONOMIC ASPECTS OF AGRICULTURE IN THE GANARASKA WATERSHED

General

The farm business study, carried on in the Ganaraska Watershed, is only a part of the general survey undertaken in 1942 in Hope and Clarke Townships of Durham County. The purpose of this general study was to obtain economic information on farming in the area that could be related to soil types, topography and other pertinent information, in ultimately arriving at an economic classification of the land and providing techniques which might be extended to other areas of Eastern Canada.

The 257 farm records, taken in the Ganaraska Watershed, do not include all the farms in the area but they provide a good cross section of the type of agriculture in the region.

Of these 257 farm business records, 208 were taken in the southern section of Hope and Clarke Townships and 49 in the northern section of these townships that has been considered to be best adapted for reforestation ^{1/}. In this report comparisons between the two sections of the Ganaraska Watershed will be made and for the purpose of this report the southern section will be designated as the "main area" and the northern section as the "forest area".

Source of Data.

The basic information of this study was provided through the courtesy of the Dominion Bureau of Statistics and supplemented by a personal visit to each farmer in the area surveyed, by representatives of the Economics Division of the Dominion Department of Agriculture.

Data on acreage and yields of crops are based on the three-year average of 1940-1942, while farm receipts and expenditures are for the year 1940.

Types of Farming

The prevailing type of agriculture carried on in the Ganaraska Watershed is mixed farming. Income is obtained from many different sources (Table 12), although receipts from livestock and livestock products predominate. Sales of cream, cattle, hogs, chickens and eggs, all have a place in the economic organization of agriculture in the area. Grains are grown chiefly for feed, and most farmers produce enough potatoes for their own use. Apple orchards, small fruits and truck crops are important enterprises on farms located in the southern section of the Watershed close to Lake Ontario in the vicinity of Port Hope.

Farms are smaller in the main area of the Ganaraska Watershed and average 160.1 acres per farm as compared with 206.0 acres in the forest area. However, 68.6 per cent of the land in the main area was classed as improved, as compared with 48.5 per cent in the forest area. The acreages in improved

^{1/} A. H. Richardson - Ganaraska Report, Chapter 12.

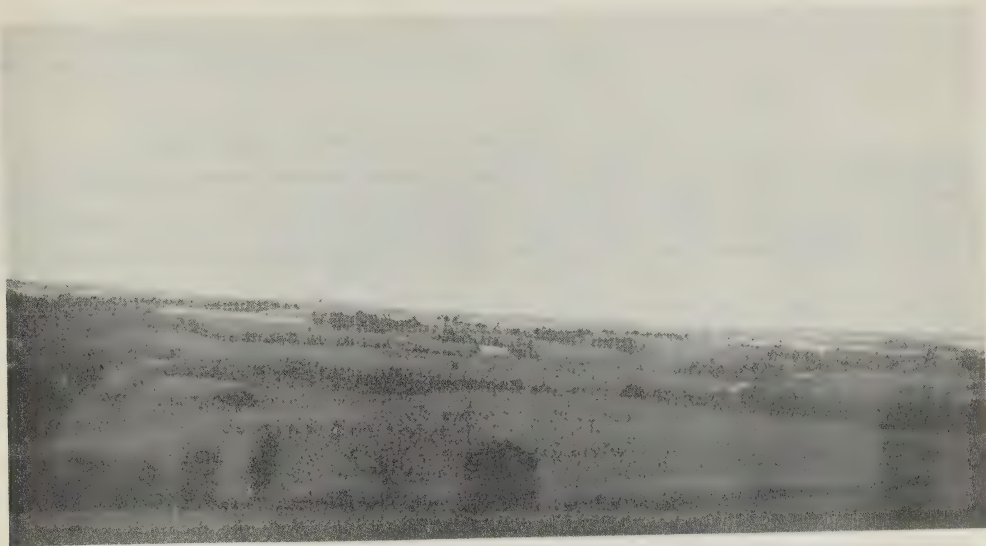


Fig. No. 2 Typical Rolling Farmland in the Ganaraska Watershed.



Fig. No. 3 One of the Better Farms in the Ganaraska Watershed.

land were respectively 109.8 acres and 100.0 acres. Crop land totalled 78.5 acres in the main area and 73.1 in the forest area.

TABLE 9. Average Size of Farm and Distribution of Land in the Ganaraska Watershed, Durham County, 1940-1942

Use of Land	Main Area		Forest Area		Total Watershed	
	Average	Per	Average	Per	Average	Per
	per farm	cent	per farm	cent	per farm	cent
	acres	%	acres	%	acres	%
All land	160.1	100.0	206.0	100.0	168.8	100.0
Improved land	109.8	68.6	100.0	48.5	107.9	63.9
Crop land	78.5	49.0	73.1	35.5	77.4	45.9
Other land improved	31.3	19.6	26.9	13.0	30.6	18.1
Unimproved land	50.3	31.4	106.0	51.5	60.9	36.1

TABLE 10. Acres in Crop in the Ganaraska Watershed, Durham County, 1940-1942

Use of Land	Main Area		Forest Area		Total Watershed	
	Average	Per	Average	Per	Average	Per
	per farm	cent	per farm	cent	per farm	cent
	acres	%	acres	%	acres	%
<u>Crop Land</u>						
Oats and mixed grain	27.2	34.6	24.7	33.8	26.8	34.6
Wheat	6.8	8.7	3.6	4.9	6.2	8.0
Corn	2.3	2.9	2.1	2.9	2.3	3.0
Rye	3.3	4.2	12.6	17.2	5.2	6.7
Hay -- mixed	19.6	25.0	18.6	25.5	19.4	25.1
alfalfa	3.4	4.3	2.8	3.8	3.2	4.1
Potatoes	1.2	1.5	1.9	2.6	1.2	1.6
Roots	.5	.7	.5	.7	.5	.6
Other crops	14.2	18.1	6.3	8.6	12.6	16.3
TOTAL CROPS	78.5	100.0	73.1	100.0	77.4	100.0

In both the main area and the forest area, oats and mixed grains occupied approximately one-third of the total crop land. Hay was next in importance and totalled 22.9 acres per farm in the main area and 21.4 acres in the forest area. Almost twice as much wheat is grown in the main area as in the forest area, while rye, a crop grown chiefly on low priced land, made up 17.2 per cent of total acreage in crops in the latter area. Other crops such as orchards, canning crops, peas and beans averaged 14.2 acres in the main area and only 6.3 acres in the proposed forest area. Tobacco, included under "other crops", is being grown successfully on certain of the sandy lands that are found in the area.

For the three years 1940-1942, the average yield per acre of various grain crops and mixed hay was substantially higher in the main area than in the forest area. (Table 11)

TABLE 11. Crop Yields, Crop Index, in the Ganaraska Watershed, Durham County

		:Average Yield per Acre (Ave. 1940-42)		
		:	:	: Total
		: Main Area	: Forest Area	: Watershed
Oats and mixed grains	bu.	32.5	26.2	31.3
Wheat	bu.	27.2	23.1	26.4
Rye	bu.	14.8	12.2	14.3
Corn	tons	8.4	6.5	8.0
Hay -- mixed	tons	1.8	1.5	1.7
alfalfa	tons	2.1	2.1	2.1
Potatoes	cwt.	58.2	58.7	54.2
Crop Index		103.0	87.3	100.0

The production per acre of alfalfa was the same in both areas, but the yield per acre of potatoes was higher in the forest area due to the fact that the soil was lighter and more suited to this crop.

The crop index ^{1/} was 103.0 in the main area and 87.3 in the forest area which means that the average yield of all crops in the main area was above the average yield for all crops in the whole Ganaraska Watershed area. This is an indication of the lower productivity of the land in the forest area, for in any farming section, crop production is a basis for the appraisal of the economic possibilities of the region.

Source of Income

The average income for all farms surveyed in the main area totalled \$1,350 per farm compared with \$907 in the forest area. In both areas the percentage of total income derived from each enterprise was similar, although the income from fruits and vegetables was higher in the main area while that from forest products was higher in the forest area.

Livestock products including sales of cream, milk, eggs, etc., average \$407 per farm in the main area or 30.2 per cent of the total revenue. Sales of all types of livestock and dressed meat averaged \$684 per farm or more than half of total income from all sources. Cash sales of grain and

^{1/} The crop index is a means by which crop yields per acre for all crops are put on a common basis. Thus a comparison of indexes on individual farms is a method of comparing efficiency in the use of land devoted to crops. The average crop yield for the Ganaraska Watershed in this instance was used as a basis and had an index of 100. A crop index of more than 100 represents better than average yields while those less than 100 represent yields that are below average.



Fig. No. 4

Oats and Mixed Grain Occupied Approximately
one third of Total Crop Land.



Fig. No. 5

Tobacco is being grown successfully on
certain lands that are found in the area.

other crops averaged \$135 per farm. In the forest area sales of livestock products averaged \$252 for the 49 farms, while revenue from livestock totalled \$468. Crop sales totalled \$86 and sales of wood and lumber averaged \$49 per farm.

TABLE 12. Sources of Income in the Ganaraska Watershed, Durham County, 1940

Source of Income	: Main Area		: Forest Area		: Total Watershed	
	: Average	: Per	: Average	: Per	: Average	: Per
	: per farm	: cent	: per farm	: cent	: per farm	: cent
	\$	%	\$	%	\$	%
Crop sales	135	10.0	86	9.5	126	10.0
Livestock products	407	30.2	252	27.8	378	29.9
Livestock	661	49.0	444	48.9	620	49.0
Dressed meat	23	1.7	24	2.6	23	1.8
Forest products	12	.9	49	5.4	19	1.5
Fruits and vegetables	58	4.3	17	1.9	50	3.9
Other sources	54	3.9	35	3.9	50	3.9
TOTAL REVENUE	1,350	100.0	907	100.0	1,266	100.0

In both the main area and the forest area, revenue from outside sources made up 3.9 per cent of total receipts.

Capitalization

The total farm capital--land, building equipment and livestock, averaged \$8,735 per farm and \$6,082 per farm in the main area and forest area, respectively. (Table 13)

TABLE 13. Value of Farm Property in Ganaraska Watershed and Forest Area, Durham County, 1940

	: Main Area		: Forest Area		: Total Watershed	
	: 208	: % of	: 49	: % of	: 257	: % of
	: Farms	: Total	: Farms	: Total	: Farms	: Total
	\$	%	\$	%	\$	%
Land	2,634	30.2	1,739	28.6	2,463	29.9
Buildings	3,106	35.5	2,123	34.9	2,918	35.5
Livestock	1,717	19.7	1,279	21.0	1,630	19.8
Equipment	1,278	14.6	941	15.5	1,214	14.8
Average Capital per Farm	8,735	100.0	6,082	100.0	8,225	100.0
Average Capital per Acre	54.56		29.52		48.72	

On the 208 farms in the main area of the Ganaraska Watershed, land made up 30.2 per cent of total farm capital, while buildings totalled 35.5 per cent, livestock 19.7 per cent with equipment making up the remaining 14.6 per cent. While average capitalization per farm in the forest area averaged \$2,700 less per farm, the percentage invested in land, buildings, livestock and equipment was similar. Average capitalization per acre in the main area was \$54.56 compared with \$29.52 in the forest area.

Assessment and Taxes

In 1941 the total assessment of land and buildings in Hope and Clarke Townships according to the township records was more than four million dollars, not including property exempt from taxation.

TABLE 14. Assessment Values in Hope and Clarke Townships,
 Durham County, 1941

		Hope	Clarke	Total
Land	\$	1,195,918	1,356,855	2,552,773
Buildings	\$	739,125	685,970	1,425,095
Other	\$	10,000	38,038	48,038
<hr/>				
TOTAL	\$	1,945,043	2,080,863	4,025,906

An analysis of the land assessments in the townships shows that the average assessment per acre was \$18.50. The assessed value of all land in Hope and Clarke Townships in 1941 was mapped by groups and is shown in Figure 6. In the forest area 16,998 acres out of a total of 79,673 acres was assessed at less than \$10 per acre.

Summary of Farm Business

The relative profitableness of farming in any area may be measured by the economic results obtained from a combination of such factors as the use of labour, the productivity of land and the efficiency of labour and equipment. One of the most reliable measures of success in farming is the net cash income which is the difference between total cash receipts and total cash expenses.

This is the amount of money available to the farmer for his living, in addition to which he has farm perquisites and the use of a house. For the year 1940, total cash receipts averaged \$1,350 per farm with cash expenses totalling \$800 and the net cash income \$550 per farm in the main area (Table 15) as compared with \$907 in cash receipts, \$463 in cash expenses and a net cash income of \$444 per farm in the forest area.

Fig. No. 6

ASSESSED VALUE OF LAND
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1942

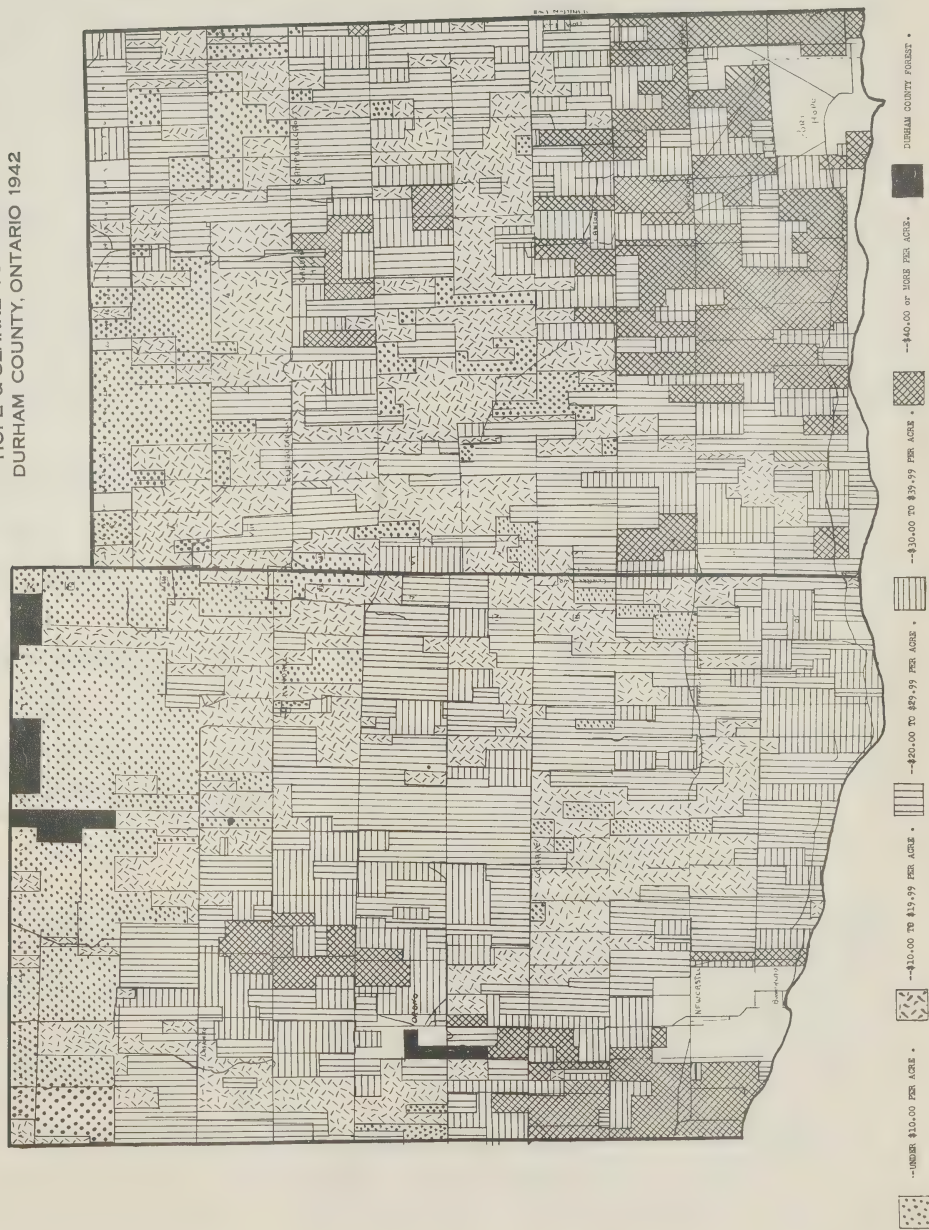


TABLE 15. Financial Summary of Farms in Ganaraska Watershed, Durham County

	:	:	:
	Main Area	Forest Area	Total Watershed
	\$	\$	\$
Farm Capital -			
Land	2,634	1,739	2,463
Buildings	3,106	2,123	2,918
Equipment	1,278	941	1,214
Livestock	1,717	1,279	1,633
TOTAL CAPITAL	8,735	6,082	8,228
Receipts -			
Crop sales	135	86	126
Livestock products	407	252	377
Livestock	661	444	620
Dressed meat	23	24	23
Miscellaneous	124	101	120
TOTAL CASH RECEIPTS	1,350	907	1,266
Expenditures -			
Current Expenses	550	380	418
Capital Expenses	250	83	218
TOTAL CASH EXPENSES	800	463	736
NET CASH INCOME	550	444	530

It must be noted that this net cash income does not make allowances for depreciation, appreciation or interest on investment in the farm.

Family Farm Living Expenses, 1942^{1/}

Some understanding of the level of living which results from agriculture in the area may be obtained from the analysis of the family living expenses collected during the survey. The cash expenditures per farm can be considered as a measure of the purchasing power which results from farming in this area. They differ from net cash income for individual families by the amount of savings or current indebtedness which occurred during the year, but averaged over all the families in the sample, the family expenses will measure income as well as cost of living.

^{1/} Written by J. N. Lewis, Economics Division, Department of Agriculture, Ottawa.

For the purpose of comparison, the expenditures of 115 families living outside the forest area of the watershed have been analysed, as well as those of 33 families living within its boundaries. The average living expenses of all the families in the watershed were \$594 during the year of the survey ^{1/}. The forest area families spent \$110 less than this, or \$484, while the families outside the area spent \$626 (Table 16). The average size of the families in the two areas was so nearly equal that it was not necessary to adjust the expenditure figures to compensate for this factor. With children under 14 years of age counted as one-half an adult, there were 3.2 adult equivalents in the forest area and 3.4 in the families outside.

The lower incomes of the families in the forest area resulted in their use of less goods and services than the other 115 families, in all of the items listed in Table 16. Less food was purchased, less clothing, and less money was available for recreation and advancement goods ^{2/}. In addition, the forest area farms were less well equipped with some of the conveniences which contribute to the modern level of living.

TABLE 16. Average Living Expenses on 35 Farms in the Forest Area and 115 Farms in the Main Area, Ganaraska Watershed, 1942

	: Forest Area : : 33 farms	: Main Area : : 115 farms	: Total : Watershed : 148 farms
	\$	\$	\$
Groceries	184	212	206
Fruits and vegetables	8	11	10
Dairy products	34	40	39
Meat	28	37	35
Total Food	254	300	290
House Operating Expenses (1)	43	66	61
Clothing	80	100	95
Total Necessities (2)	377	466	446
Advancement Goods	74	119	109
Recreation	33	41	38
Total Expenses	484	626	593

- (1) Includes expenditures for light, heat, telephone, new furnishings and miscellaneous housekeeping expenses.
 (2) Includes expenditures for education, insurance, church and charity and automobile operation.

^{1/} October 1st, 1941, to September 30th, 1942.

^{2/} Church donations and car expenses were included in advancement goods because, besides their normal position in the budget, they contribute to personal contacts among rural people which compensate for privileges not found in rural areas.

Only 10 per cent had electricity in the home, as compared with the 30 per cent of the other 115 families; the percentage of telephones was the same in both groups. Some 66 per cent of the families outside the forest area had automobiles for family use, as against 40 per cent of the families living within the forest area. These are not all the conveniences which contribute to the level of living, and there are also factors which modify the use of the ones considered. Electricity is not always available even if subscribers are able to pay for the service, and lack of adequate roads may curtail the use of cars. However, in this case the data indicate a difference in level of living between the two groups.

To return to the living expenses, it should be pointed out that low incomes not only limit the goods and services which can be purchased, but also force the expenditure of a large part of the income for physical necessities, leaving small amounts for recreation and advancement goods. The high level of living associated with western civilization has been accompanied by a decline in the proportion of the family budget taken up by food and shelter and an increasing expenditure for advancement and recreation goods.

TABLE 17. Percentage Distribution of Living Expenses on 33 Farms in the Forest Area and 115 Farms in the Main Area of the Ganaraska Watershed, Durham County, 1942

	: Forest Area : : 33 farms	: Main Area : : 115 farms	: Total : : Watershed : : 148 farms
	%	%	%
Groceries	38	35	35
Fruits and vegetables	2	2	2
Dairy products	7	6	6
Meat	6	6	6
Total Food	53	49	49
Household Expenses	9	10	10
Clothing	17	16	16
Total Necessities	79	75	75
Advancement Goods	15	19	19
Recreation	6	6	6
TOTAL EXPENSES	100	100	100

This relationship is illustrated to a limited extent in the two groups of families under consideration. The families in the forest area, with the lower incomes, devoted 79 per cent of their incomes to necessities while the 115 families spent 75 per cent for these same needs (Table 17). These

figures are not greatly different, which leads to the inference that the pressure of living is almost as great on the latter families as on the former. In other words, if the income of the 33 forest area farms could be brought up to that of the group with which they are being compared, the additional money would be largely spent for food and clothing.

One further consideration arises in this connection as a result of the contribution to the family living which the farm makes. The food from garden and livestock, firewood from woodlot and use of the house are perquisites which add to the level of farm family living. It is conceivable that the lower expenses for food of the forest area farms might have resulted from their use of large amounts of home produced food. That this is not so is evident from Table 18, which compares the farm value of the perquisites used by the two groups of families. Most of the total difference comes from the use of the house; the farm homes among the 115 families outside the forest area being of higher value, on the average, than those of the 33 families in the other group. However, even as far as food is concerned, the former used slightly less than did the latter.

TABLE 18. Comparison of the Value of Farm Perquisites on 33 Forest Area Farms with those of the 115 Farms in the Main Area, Durham County, 1942

	: : Forest Area : 33 farms	: : Main Area : 115 farms	: : Total : Watershed : 148 farms
	\$	\$	\$
Fruits and vegetables	28	40	37
Dairy products	48	48	48
Meat	42	39	39
Total Food Perquisites	118	127	124
Firewood	52	63	61
Use of House (1)	57	88	81
Total Perquisites	227	278	266

(1) Five per cent of the value of the house.

Size of Farm in Relation to Other Factors

As would be expected, size of farm has a definite influence on all economic factors which make up the final returns to the farmer. (Tables 19 and 20).

As the average size of farms in each group increased, it is natural to expect that acreage in crop and capitalization will be increased.

TABLE 19. Crop Acreage, Yields, Crop Index, Man Work Units, Animal Units and Man Equivalent on Different Size Groups of Farms in the Ganaraska Watershed, Durham County

	Size of Farm - Acres			
	Under		Over	All
	:: 126	: 126-250	: 250	: Farms
<u>Main Area</u>				
Number of farms	91	95	22	208
Average size - acres	90.7	184.9	340.5	160.1
Acres in crops	54.7	87.7	136.7	78.5
Yields of oats per acre - bu.	29.8	33.5	34.9	32.5
Yields of hay per acre - tons	1.7	1.7	2.9	1.8
Yields of potatoes per acre - cwt.	50.0	52.3	59.9	53.2
Crop index per farm	98.6	102.5	113.0	103.0
Man work units per farm	283.8	393.0	612.3	368.4
Animal units per farm	19.64	29.27	49.91	27.24
Man equivalent per farm	1.35	1.61	2.14	1.55
Man work units per man equivalent	210.4	244.7	285.5	237.6
<u>Forest Area</u>				
Number of farms	11	22	16	49
Average size - acres	96.4	180.2	316.8	206.0
Acres in crops	42.1	74.2	92.7	73.0
Yields of oats per acre - bu.	26.1	26.1	26.4	26.2
Yields of hay per acre - tons	1.18	1.54	1.57	1.31
Yields of potatoes per acre - cwt.	50.1	54.5	65.1	58.7
Crop index per farm	86.6	85.9	89.3	87.3
Man work units per farm	210.0	335.0	417.0	333.0
Animal units per farm	12.6	23.3	28.0	22.4
Man equivalent per farm	1.0	1.5	1.8	1.5
Man work units per man equivalent	210.0	223.0	232.0	229.9

Information brought out in Tables 19 and 20 show that as the farms increased in size the crop yields, receipts, expenditures and net cash income also increased. In the main area, the crop index increased from 98.6 on the farm less than 125 acres, to 113 in that group over 250 acres. Similarly, the animal units per farm increased as did the labour efficiency per farm. Labour efficiency, in this instance, is measured by the number of productive days work ¹/_{performed} by each man on the farm during the year. In this connection, it may be noted that in each size group the labour efficiency was higher in the main area than in the forest area.

¹/ A productive man work day (which is taken as one unit) is a measure of the productive work performed on the farm or group of farms, based on average standards of labour required for an acre of crop or a head of livestock.

TABLE 20. Capitalization, Receipts, Expenditures and Net Cash Income on Different Size Groups of Farms in the Ganaraska Watershed, Durham County, 1940

	Size of Farms - Acres			
	Under 126	126 - 250	Over 250	All Farms
<u>Main Area</u>				
Number of farms	91	95	22	208
Average size - acres	90.7	184.9	340.5	160.1
Capitalization:-	\$	\$	\$	\$
Land	1,754	3,105	4,241	2,634
Buildings	2,261	3,403	5,323	3,106
Livestock	1,209	1,845	3,258	1,717
Equipment	922	1,410	2,181	1,278
Capitalization per farm	6,146	9,763	15,003	8,735
Capitalization per acre	67.76	52.80	44.06	54.56
Receipts	1,034	1,385	2,513	1,351
Expenditures	568	763	1,926	1,801
Net cash income per farm	466	622	587	550
<u>Forest Area</u>				
Number of farms	12	24	13	49
Average size - acres	91.7	179.7	324.1	196.4
Capitalization:-	\$	\$	\$	\$
Land	1,194	1,712	2,292	1,739
Buildings	1,339	2,148	2,800	2,123
Livestock	873	1,386	1,457	1,279
Equipment	841	958	1,000	941
Capitalization per farm	4,247	6,204	7,549	6,082
Capitalization per acre	46.31	34.52	23.29	30.96
Receipts	586	926	1,167	907
Expenditures	399	455	535	463
Net cash income per farm	187	471	632	444

The average total capitalization on all farms in the main area in 1940 was \$8,735 or an average of \$54.56 per acre. In the main area, the total capitalization per farm under 126 acres was \$6,146 as compared with \$9,763 in the 126-250 acre group and \$15,003 for the over 250 acre group. It is significant that in the forest area, the average capitalization per farm was only \$6,082. In this latter area, the capital invested in 12 farms under 126 acres averaged only \$4,247, while the middle and largest groups averaged \$6,204 and \$7,549, respectively.

Conditions of Buildings in Relation to Returns and Capitalization

The condition of the buildings on all farms in the Ganasaraska Watershed was noted and the house and barn of each farm considered as a unit and classed as either poor, poor to fair, fair to good or good. For the purposes of analysis the farm buildings rated as good were classed with the fair to good group. In each group the condition of the farm buildings gave a good indication of the size of enterprise as well as the value of farm and its productivity. (Table 21a)

TABLE 21a. Condition of Buildings Related to Size of Farm, Capitalization and Crop Index in the Ganasaraska Watershed, Durham County, 1942

	: Condition of Buildings :			
	: Poor :	: Poor to Fair:	: Fair to Good:	All
	: Poor :	: Poor to Fair:	and Good :	Farms
Number of farms	104	113	40	257
Acres per farm	138.1	171.9	228.5	168.8
Capitalization:				
Land and buildings	\$4,587	\$5,533	\$7,026	\$5,381
Buildings	2,470	2,989	3,888	2,918
Crop index	98.9	99.8	104.6	100.3
Man work units per farm	320.5	370.5	444.4	361.8
Animal units per farm	22.6	27.0	34.3	26.3

The 104 farms in the Ganasaraska Watershed with the poorest buildings averaged 138.1 acres and were valued at \$4,587 compared with an average of \$5,381 for all farms in the Watershed. The estimated value of 11 poor farms located in the forest area was only \$1,959 and buildings were valued at \$900. (Table 21c) This compared with \$4,790 for land and buildings and \$2,656 for buildings alone in the main area. (Table 21b)

TABLE 21b. Condition of Buildings Related to Size of Farm, Capitalization and Crop Index in Main Area of Ganasaraska Watershed, Durham County, 1942

	: Condition of Buildings :			
	: Poor :	: Poor to Fair:	: Fair to Good:	All
	: Poor :	: Poor to Fair:	and Good :	Farms
Number of farms	93	94	21	208
Acres per farm	136.3	168	230	160.1
Capitalization:				
Land and buildings	\$4,790	\$5,936	\$8,598	\$5,741
Buildings	2,656	3,229	4,555	3,107
Crop Index	100.8	102.2	113.7	103.0
Man work units per farm	323	383	506	362
Animal units per farm	23	28	42.6	27.2

The 40 farms in the Watershed with buildings classified as fair to good or good averaged 228 acres in size and were valued at \$7,026 of which \$3,888 were in buildings alone.

TABLE 21c. Condition of Buildings Related to Size, Capitalization and Crop Index in the Forest Area, Durham County

	Condition of Buildings			All Farms
	Poor	Poor to Fair	Fair to Good and Good(1)	
Number of farms	11	19	19	49
Acres per farm	171	200	232	206
Capitalization:				
Land and buildings	\$1,959	\$3,405	\$5,289	\$3,811
Buildings	900	1,751	3,492	2,102
Crop index	79.3	84.5	92.3	87.3
Man work units per farm	299	310	377	333
Animal units per farm	19.0	21.9	25.0	22.4

(1) No farm buildings were classified as good in the forest area.

In the main area the 21 farms with the best buildings were valued at \$8,598 while the crop index was shown as 113.7. These 21 farms averaged 42.6 animal units per farm as compared with 26.3 animal units for all farms in the Watershed.

Range of Cash Income

It is shown in Table 22 that in the main area 13.9 per cent of the 208 farms studied had minus incomes of \$345 per farm. This means that these farmers were short to that extent of meeting the cash expenses required for operating their farms and they had nothing left for living. In the forest area 12.1 per cent of the 49 farms had minus incomes of \$263 per farm.

TABLE 22. Range of Net Cash Income in the Ganaraska Watershed, Durham County, 1940

	Main Area		Forest Area		Total	
	Per cent:Net Cash of farms:	Income	Per cent:Net Cash of farms:	Income	Per cent:Net Cash of farms:	Income
Minus Income	13.9	\$ - 345	12.1	\$ - 263	13.6	\$ - 329
Under \$200	9.1	113	16.3	77	10.5	106
\$200 - \$399	19.7	285	18.4	317	19.4	291
\$400 - \$599	18.8	487	18.4	482	18.7	486
\$600 - \$799	9.6	692	18.4	689	11.3	691
\$800 - \$999	10.1	891	8.2	896	9.7	892
\$1000 - over	18.8	1,514	8.2	1,437	16.8	1,499
All farms	100.0	550	100.0	444	100.0	530
(Total and Average)						

The percentage of farms in the next income group, that is, under \$200 was respectively 9.1 per cent and 16.3 per cent; cash income averaged \$113 in the main area and \$77 in the forest area.

In the income groups, \$200 - \$399 and \$400 - \$599, the percentage of farms and the averages of cash income were about the same in the two areas.

The percentage of farms in the income group ranging from \$600 - \$799 was respectively 9.6 and 18.4 for main area and forest area farms. The cash income averaged \$692 in the main area and \$689 in the forest area. In the income group ranging from \$800 - \$999 the percentage of farms and the cash income were practically the same in both areas. The percentage of farms in the income group of \$1,000 and over was 18.8 per cent in the main area and 8.2 per cent in the forest area. Cash income for farms in this range averaged \$1,514 and \$1,437, respectively.

While the average net cash income for the 208 farms in the main area was greater by \$106 than that in the forest area, it may be pointed out that either minus incomes or incomes under \$600 were recorded on 61.5 per cent of the farms in the main area as compared with 65.2 per cent of the farms in the forest area. The percentage of farms with low incomes would, therefore, appear to be about equal in both areas.

Comparison of Successful and Unsuccessful Farms

In any area, a comparison of groups of farms which have been successful with those that have been unsuccessful furnish some very informative data. An analysis is made here of the 25 most successful farms from the point of view of returns with the 25 poorest farms.

The average capital invested per farm for both groups was very much above the average capitalization for farms in the area. This would bear out the thought that while large farms are in a better position to make money than are smaller farms, they are also in a position to lose more if efficient farming is not carried on or if crops or prices are below average.

An analysis of cash receipts from the two groups of farms shows that the revenue derived from various sources--crop sales, livestock and miscellaneous receipts--averaged \$2,799 for the best and \$1,074 for the poorest farms. On the other hand, the total cash expenses averaged \$1,021 for the best farms as compared with \$1,520 for the poorest farms. Net cash income averaged respectively \$1,778 and minus \$446 which represents a difference of \$2,224.

The productive man work units averaged 575.4 with net returns of \$3.09 per unit on the best farms as compared with 348.1 man work units and a loss of \$1.28 per unit on the poorest farms.

There are some sections in the Ganaraska Watershed where the productivity of the land is still good and farming profitable but the low level of production on many farms reduced the average for the whole area.

TABLE 23. Financial Summary of the 25 Best and 25 Poorest Farms in the Ganaraska Watershed, Durham County, 1940

	: : 25 Best Farms \$: : 25 Poorest Farms \$
Farm Capital:		
Land	3,388	3,594
Buildings	4,308	3,870
Equipment	1,977	1,729
Livestock	2,730	1,911
Total Capital	12,403	11,104
Receipts:		
Crop sales	242	159
Livestock products	657	383
Livestock	1,375	475
Dressed meat	56	5
Miscellaneous	469	52
Total Cash Receipts	2,799	1,074
Expenditures:		
Current expenses	770	1,005
Other expenses	251	515
Total Cash Expenses	1,021	1,520
Net Cash Income	1,778	- 446
Efficiency Factors:		
Man work units per farm	575.4	348.1
Net returns per man work unit	\$3.09	- \$1.28
Animal unit per farm	42.42	26.78
Net returns per animal unit	\$41.90	- \$16.69

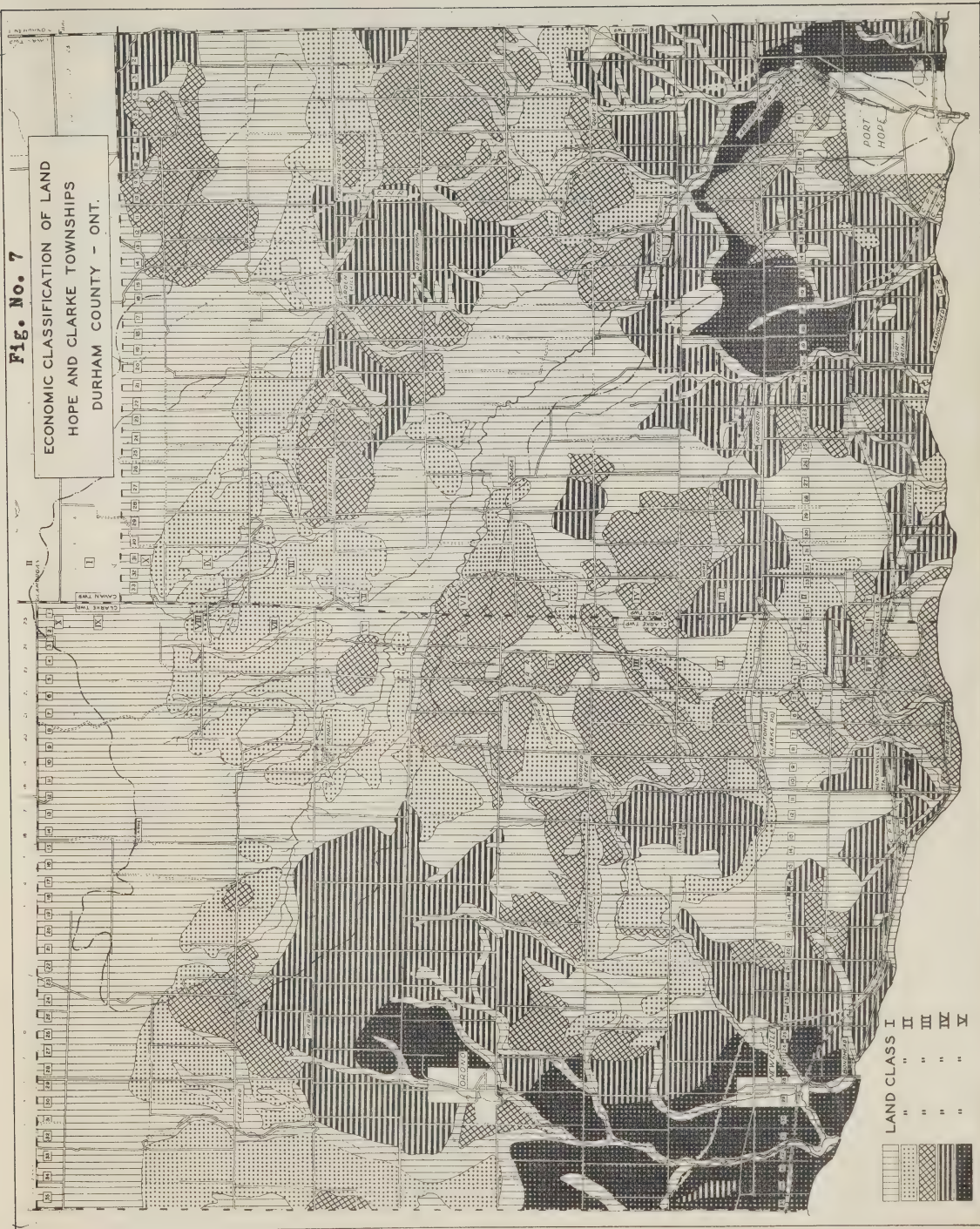
AN ECONOMIC STUDY OF LAND CLASSES IN HOPE AND CLARKE TOWNSHIPS

In the introduction, reference was made to the decline in the population of Hope and Clarke Townships in Durham County (not including towns of Port Hope and Newcastle) from 11,458 in 1861 to 5,308 in 1941, a decrease of 53.7 per cent. This was due to changing economic conditions which have resulted in some farms being abandoned, while others have been farmed more extensively and have expanded to take in adjacent farm areas. It is the intention in this part of the study to discuss the land classes in two townships and to study the set-up and returns of the farms in each land class.

Land classification represents the grading of land on the basis of its productivity and potential use. The classification used in this sense takes into consideration soil, topography, present use of land, crop yields, livestock production, condition of buildings, returns and other economic factors.

Fig. No. 7

ECONOMIC CLASSIFICATION OF LAND
HOPE AND CLARKE TOWNSHIPS
DURHAM COUNTY - ONT.



It is intended to reveal productive value and the use to which land should be put.

The land classes as outlined in this section have been established on the basis of returns that may be expected from mixed farming in Hope and Clarke Townships.

Land Class I is submarginal land and is the lowest class of land to be found in the two townships of Hope and Clarke. Returns to farmers located on farms predominantly in this land class were definitely lower than the farmer might earn as a hired man. Much of the land in this class is swampy or undrained, while other parts are heavily wooded. Any land that is cleared is mainly of a sandy or gravelly nature and the topography is steep and hilly. While some of the Class I land is being used successfully at the present time for tobacco production, no attempt has been made in this report to grade the land on its ability to produce tobacco.

Land Class II is also submarginal and soils are, for the most part, light sandy or gravelly loams. Topography of land is undulating to rolling. Much of this land is being farmed successfully at the present time when combined with land in the better land classes. Land in this class can be used satisfactorily for pasture purposes.

Land Class III is considered marginal land and, under average conditions, will yield the farmer only enough to pay the upkeep of land and buildings and hired man's wages for himself. Most of the land in this class is undulating and the soil, for the most part, is sandy loam, being suited to the growing of grain and fodder crops.

Land Class IV is above the marginal land class and under proper management would yield a farmer a better than average return. Class IV land is usually fairly accessible to good roads and includes soils that are suited to the growing of cash crops.

Land Class V is the best grade of land to be found in Hope and Clarke Townships and is usually relatively level land that is very intensely cropped and is adjacent to good markets. Farms on Land Class V, under proper management, will yield returns to the operator that are sufficient to enable the operator and his family to enjoy a relatively high standard of living.

Methods of Determining Land Classes

Soil maps prepared by the Ontario and Dominion Departments of Agriculture ^{1/} were used as the initial basis for land classification. All soils in the two townships had been grouped on the basis of their physical characteristics and for purposes of this land classification were divided into five main groups. The soil class boundaries were then adjusted using the present land use as a further refinement in the classification. For instance, all land at present in forest, regardless of its possible yield if cleared,

^{1/} Soils of Durham County, Experimental Farm Service, Dominion Department of Agriculture in co-operation with Ontario Agricultural College, Guelph, Ontario.

was classified as Land Class I for agricultural purposes. Further revisions of these land classes were made, using the crop index, the livestock index and conditions of buildings as the basis of change. Once this preliminary map had been completed, the area was revisited and further adjustments were made on the basis of topography and road conditions. The final land class map (Figure 7) therefore represents an attempt to take into consideration most of the factors which influence farm returns.

Condition of Buildings in Hope and Clarke Townships

The condition of farm buildings is considered one measure of productivity of land. All barns and houses in the two townships of Hope and Clarke were classified separately on the basis of their condition into five different classes ranging from poor to excellent. Altogether, in Hope and Clarke Townships there were 1,902 usable houses and barns and the condition of these buildings is analysed in Table 24.

TABLE 24. Condition of Occupied Houses and Barns and Percentage in Each Class, Hope and Clarke Townships, 1942

Condition of: Building	Houses				Barns				Total			
	: Hope	: Clarke	: Total	: Per cent	: Hope	: Clarke	: Total	: Per cent	: Hope	: Clarke	: Total	: Per cent
<u>Occupied</u>												
Excellent	11	6	17	1.8	9	8	17	1.7	20	14	34	1.8
Good	47	56	103	11.2	25	34	59	6.0	72	90	162	8.5
Fair to Good	184	196	380	41.3	172	153	325	33.1	356	349	705	37.1
Poor to Fair	148	135	283	30.7	216	222	438	44.7	364	357	721	37.9
Poor	60	78	138	15.0	52	90	142	14.5	112	168	280	14.7
<u>Total</u>												
Occupied	450	471	921	100.0	474	507	981	100.0	924	978	1,902	100.0
<u>Unoccupied but usable</u>												
	26	24	50		18	25	43		44	49	93	
	476	495	971		492	532	1,024		968	1,027	1,995	
<u>Abandoned</u>												
not usable	12	17	29		12	16	28		24	33	57	
<u>Buildings levelled</u>												
	(1)	(1)			(1)	(1)			37	40	77	

(1) Levelled building not classified as houses or barns.

Only ten per cent of the buildings in the township could be classed in the two lowest groups. In addition to the usable buildings shown in the classification, there were 93 buildings that were unoccupied at the time of the survey, but which were classified as usable. In addition to the usable buildings, there were 29 houses and 28 barns in the two townships which were abandoned and classified as not usable as well as 57 buildings that had been levelled with only the foundation



Fig. No. 8

A Fine Set of Buildings on Some of Best Land
in Clarke Township.



Fig. No. 9

Abandoned Buildings on the Same Highway
as Buildings Shown Above.

showing. The majority of these levelled buildings were in the northern part of the two townships.

Area by Land Classes

A breakdown of the land area in the two townships shows that of the estimated 139,000 acres, 58,000 acres or 41.7 per cent were Land Class I, 20,000 acres were Land Class II, 26,000 acres were Land Class III, 27,600 Land Class IV, and the remaining 8,900 acres or 6.4 per cent was classed as top grade for the area.

TABLE 25. Area in Land Classes, Hope and Clarke Townships, 1940

Land Class	Hope		Clarke		Total	
	acres	Per cent	acres	Per cent	acres	Per cent
I	27,300	41.3	30,900	42.6	58,200	41.9
II	8,100	12.2	11,900	16.4	20,000	14.4
III	13,700	20.7	10,300	14.2	24,000	17.3
IV	14,100	21.3	13,600	18.7	27,700	20.0
V	3,000	4.5	5,900	8.1	8,900	6.4
	66,200	100.0	72,600	100.0	138,800	100.0

It should be noted that 56 per cent of all land in the two townships is classified as submarginal (Land Classes I and II).

Analysis of Farm Business by Land Classes

In order to decide the economic value of each land class it is necessary to make an analysis of the farm organization in each class. Once the land class boundaries had been established, approximately one quarter of all farms in each concession were located on the base land class map. Altogether 225 farms were located in the two townships but further analysis showed that only 182 of these farms were predominantly in one of the five land classes. Actual crop land was the determining factor in grouping the farms in their various land classes. Twenty-five of the 182 farms had most of their crop land in the poorest land class, 32 farms were grouped in Class II, 41 farms were placed in Class III, while 66 farms had most of their crop land in Land Class IV with 18 farms in the top group, Land Class V.

Utilization of Land.

In Land Class I only 37 per cent of the total land was suitable for crops compared with 55 per cent for Land Class III and 66 per cent for Land Class V. The area in woodland, improved and unimproved pasture land was greater in the poorer land classes than in the higher land classes.

The size of farms in Land Class I averaged 143.8 acres compared with 128.2 for Land Class IV and 123.9 for Land Class V.

TABLE 26. Utilization by Land Classes in Hope and Clarke Townships, 1940

	Land Class					All
	I	II	III	IV	V	Classes
Number of Farms	25	32	41	66	18	182
	acres	acres	acres	acres	acres	acres
Crop land	53.8	64.2	80.0	74.3	81.8	71.7
Pasture	20.1	29.8	20.4	18.7	13.0	20.4
Other improved	4.5	2.7	5.0	4.7	4.0	4.6
Total Improved	78.4	96.7	105.4	97.7	98.8	96.7
Woodland	19.6	21.9	11.5	10.5	8.9	13.8
Unimproved pasture	45.2	28.9	27.5	19.8	16.2	26.3
Swamp	.6	2.3	.1	.2	- -	.6
Total Unimproved	65.4	53.1	39.1	30.5	25.1	40.7
Total Land	143.8	149.8	144.5	128.2	123.9	137.4

Crop Yields and Acres in Crops.

TABLE 27. Yield of Crops by Land Classes in Hope and Clarke Townships, 1940

Crops	Land Class					All
	I	II	III	IV	V	Classes
Number of Farms	25	32	41	66	18	182
Wheat	bu. 14.2	24.1	25.0	28.4	31.2	26.6
Oats & mixed grain	bu. 22.5	27.3	37.0	37.7	49.2	35.8
Barley	bu. - -	27.5	20.6	32.9	34.0	30.8
Rye	bu. 10.8	11.7	13.8	18.3	25.7	13.4
Buckwheat	bu. 12.8	16.8	18.1	20.1	23.8	17.6
Beans - field	bu. 15.2	- -	9.4	27.0	- -	22.6
Peas - field	bu. 15.6	8.7	15.1	10.9	20.0	13.0
Hay - mixed	tons 1.2	1.4	1.4	1.6	2.4	1.5
Alfalfa	tons 2.5	1.9	2.5	2.0	2.6	2.2
Corn - silage	tons 3.1	5.7	7.0	8.4	6.1	6.9
Roots	tons 8.5	9.4	12.1	11.4	20.5	12.3
Potatoes	cwt. 43.2	43.5	48.9	43.3	51.8	44.6
Crop Index	76.3	88.5	98.0	109.1	139.1	103.3

The crop index as shown in Table 27 is a means by which crop yields per acre for all crops are put on a common basis. Thus a comparison of indexes on individual farms or groups of farms is a method of comparing the productivity

CROP LAND
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941

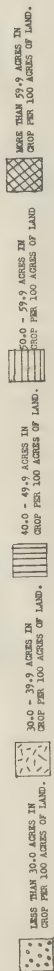


Fig. No. 11

NUMBER OF ACRES IN OATS
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941

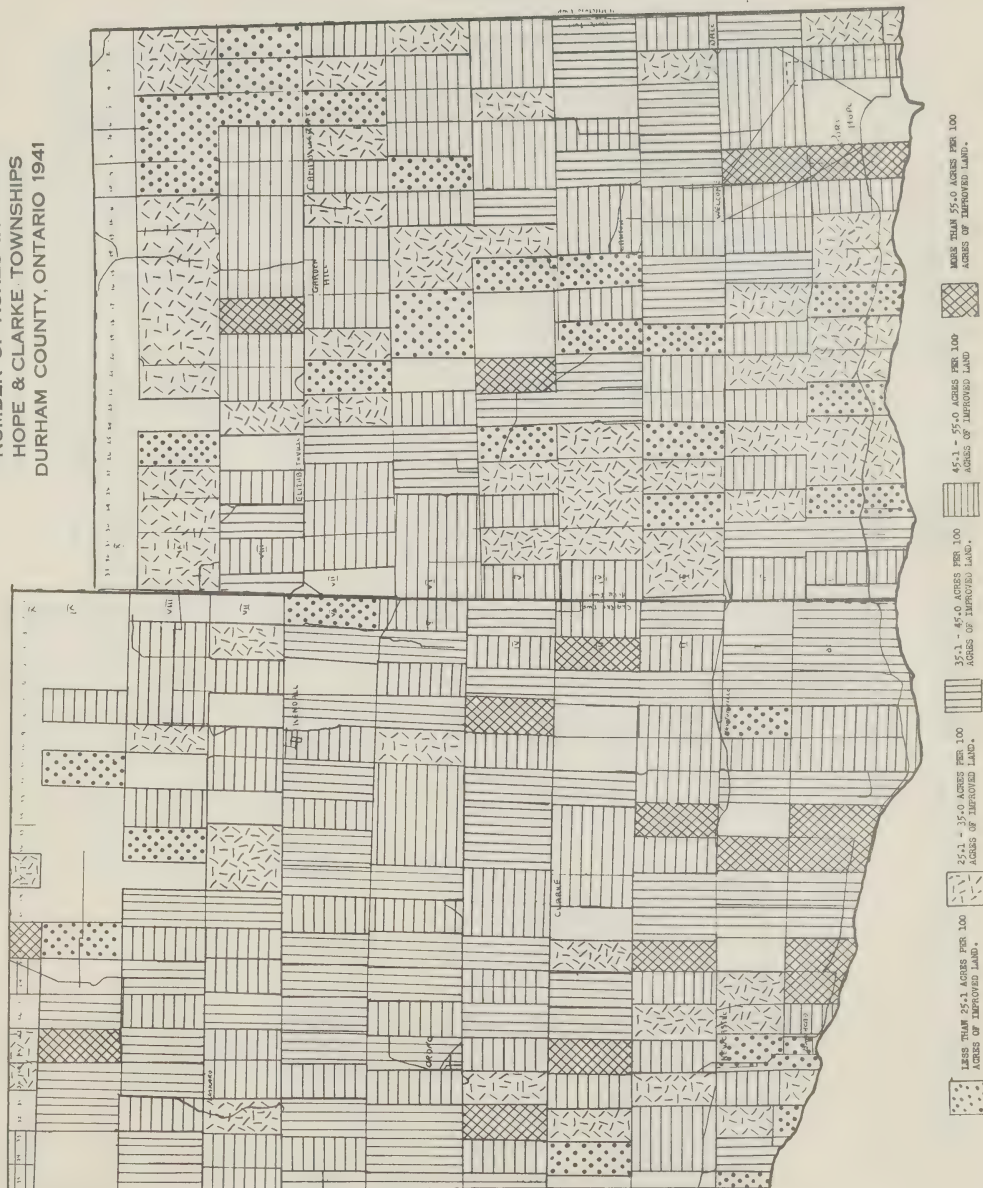
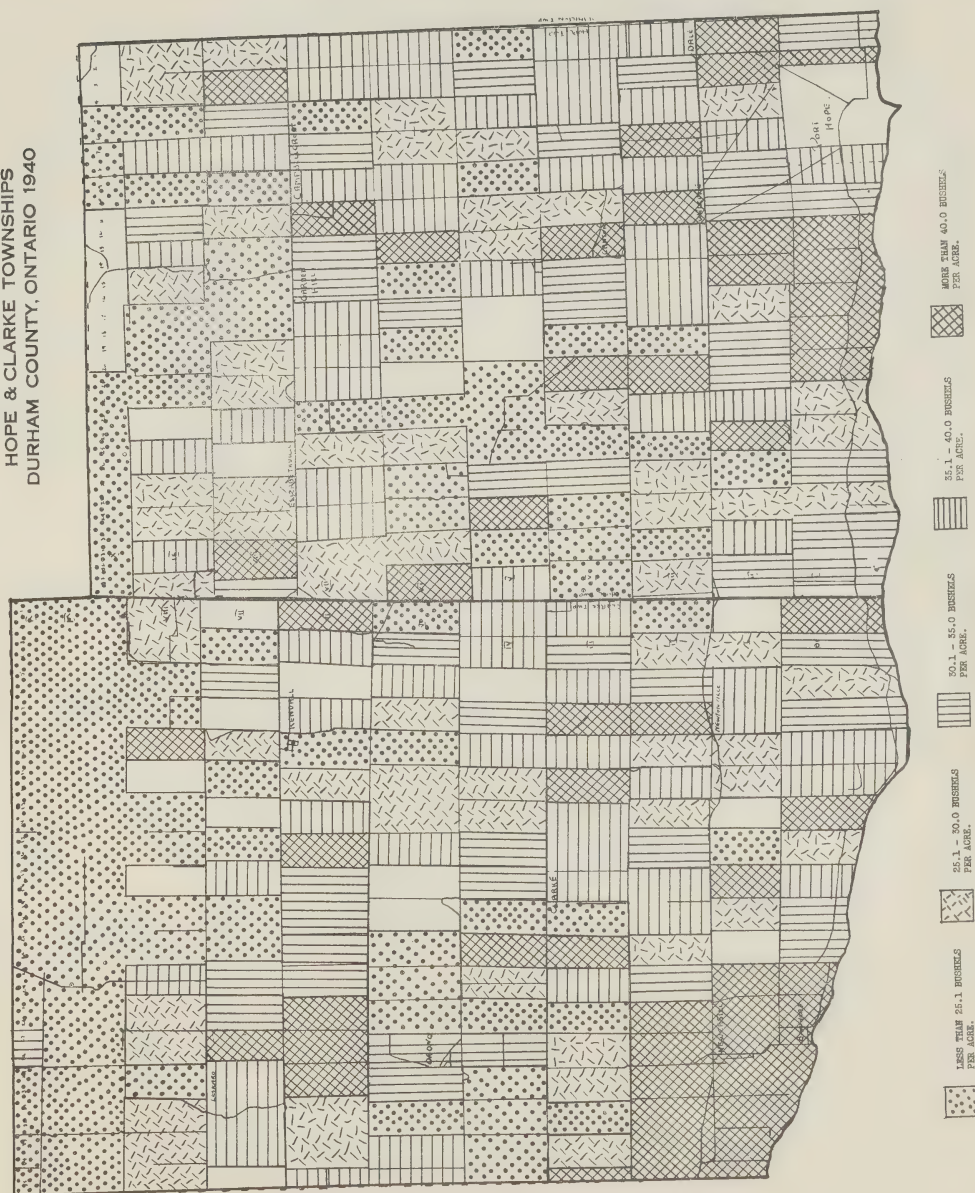


Fig. No. 12

**YIELD OF OATS PER ACRE
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1940**



NUMBER OF ACRES IN RYE
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941



of land devoted to crops. Average crop yields for Durham County are used as a basis and have an index of 100. A crop index of more than 100 represents better than average yields while those less than 100 represent yields that are below average.

It might be noted that the crop yields, as reflected by the crop index, show a definite upward trend from the lower to the higher land classes. However, when analysing the yields of the individual crops, it can be seen that while the grain yields follow the general trend, yields of such crops as alfalfa, beans, corn, and potatoes do not show significant changes.

The area planted to wheat, oats and mixed grain is greater on the better land while rye and buckwheat show a decided decrease as the land classes improve. More alfalfa is grown on Land Classes IV and V than on the lower land classes. Potato acreage shows a decided decline on the higher land classes. This crop is grown as a cash crop on the light lands of Land Classes I and II, whereas in Land Classes IV and V where the soil is heavier, potatoes are grown for the most part only for home consumption. Commercial orchards are confined almost entirely to Land Class V and the farms in this group averaged 6.3 acres in fruits and vegetables.

TABLE 28. Average Acres per Farm in Crops by Land Classes in Hope and Clarke Townships, 1940

Crops	Land Class					All Classes
	I	II	III	IV	V	
	acres	acres	acres	acres	acres	acres
Wheat	1.8	3.1	7.3	6.7	5.1	5.3
Oats and mixed grain	21.0	25.9	32.4	31.2	36.2	29.6
Barley	-	.3	1.4	1.7	6.3	1.6
Rye	8.6	7.6	3.5	2.5	.8	4.3
Buckwheat	2.2	2.5	3.9	1.3	.4	2.2
Beans	.1	-	.2	.5	-	.3
Peas	1.3	.5	.9	1.1	.5	.9
Hay	13.6	15.1	23.1	19.2	15.9	18.3
Alfalfa	.6	3.8	2.5	4.3	6.2	3.5
Corn	1.4	2.2	2.9	2.7	2.8	2.5
Turnips and mangels	.4	.6	.7	.8	1.0	.7
Potatoes	1.7	1.4	.8	.9	.3	1.0
Orchard and vegetables	1.0	1.2	.4	1.4	6.3	1.5
Total Crops	53.7	64.2	80.0	74.3	81.8	71.7

Livestock.

Number and types of livestock on farms in various land classes are shown in Table 29. The term animal unit, used in this table is for purposes of comparing different classes of animals and to compute the total amount of livestock on farms on a cow equivalent basis. An animal unit is the approximate

equivalent from the standpoint of feed required and manure produced during the year, of a mature horse or cow. The number of animal units per farm increased from Land Class I to Land Class IV and declined slightly on farms in Land Class V. This decrease of animal units in the top land class is accounted for by the trend away from livestock production on the better land due to utilization of land for such intensive crops as orchards, vegetables and canning crops.

TABLE 29. Number of Livestock on Farms in Different Land Classes in Hope and Clarke Townships, 1941

Livestock	Land Class					All
	I	II	III	IV	V	Classes
	no.	no.	no.	no.	no.	no.
Horses and colts	3.4	4.3	4.8	4.8	4.7	4.5
Calves	3.2	3.9	4.9	5.5	6.1	4.8
Heifers - milk	1.4	1.2	1.7	1.9	2.8	1.7
- beef	.6	.7	.8	1.2	1.2	.9
Cows - milk	5.0	6.4	7.8	8.5	8.9	7.5
- beef	.8	.2	.9	1.2	.7	.8
Steers under 1 year	1.0	1.6	2.2	2.3	.5	1.8
1 year and over	.8	1.3	1.6	2.6	1.2	1.7
Bulls	.7	.2	.3	.5	.8	.4
Sheep and lambs	4.1	14.3	9.2	8.5	2.9	8.5
Hens and chickens	137.0	131.2	169.4	188.0	224.1	170.4
Turkeys	2.8	4.3	5.4	2.0	-	3.1
Ducks and geese	4.0	3.8	4.5	6.9	3.7	5.1
Sows	1.0	1.0	1.8	2.0	1.8	1.6
Swine	6.0	8.7	16.5	20.2	17.2	15.1
Number of animal units	18.27	21.60	27.53	30.44	26.49	26.17

Receipts, Expenses and Returns.

Returns on farms in various land classes are itemized in Table 30. The net cash income from farms located on Land Class I totalled only \$357. This figure represents the total cash income after all current and capital expenses for the year were paid and was used to take care of interest on borrowed capital as well as all family living expenses. The net cash income increased from \$357 for farms in Land Class I to \$658 for the eighteen farms located in Land Class V.

Average receipts and expenditures per farm increased as the land class improved although the total receipts increased at a faster rate than expenditures.

The breakdown of receipts shows a very clear picture of the type of farming carried on in each of the five land classes.

Fig. No. 14
NUMBER OF BEEF CATTLE
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941

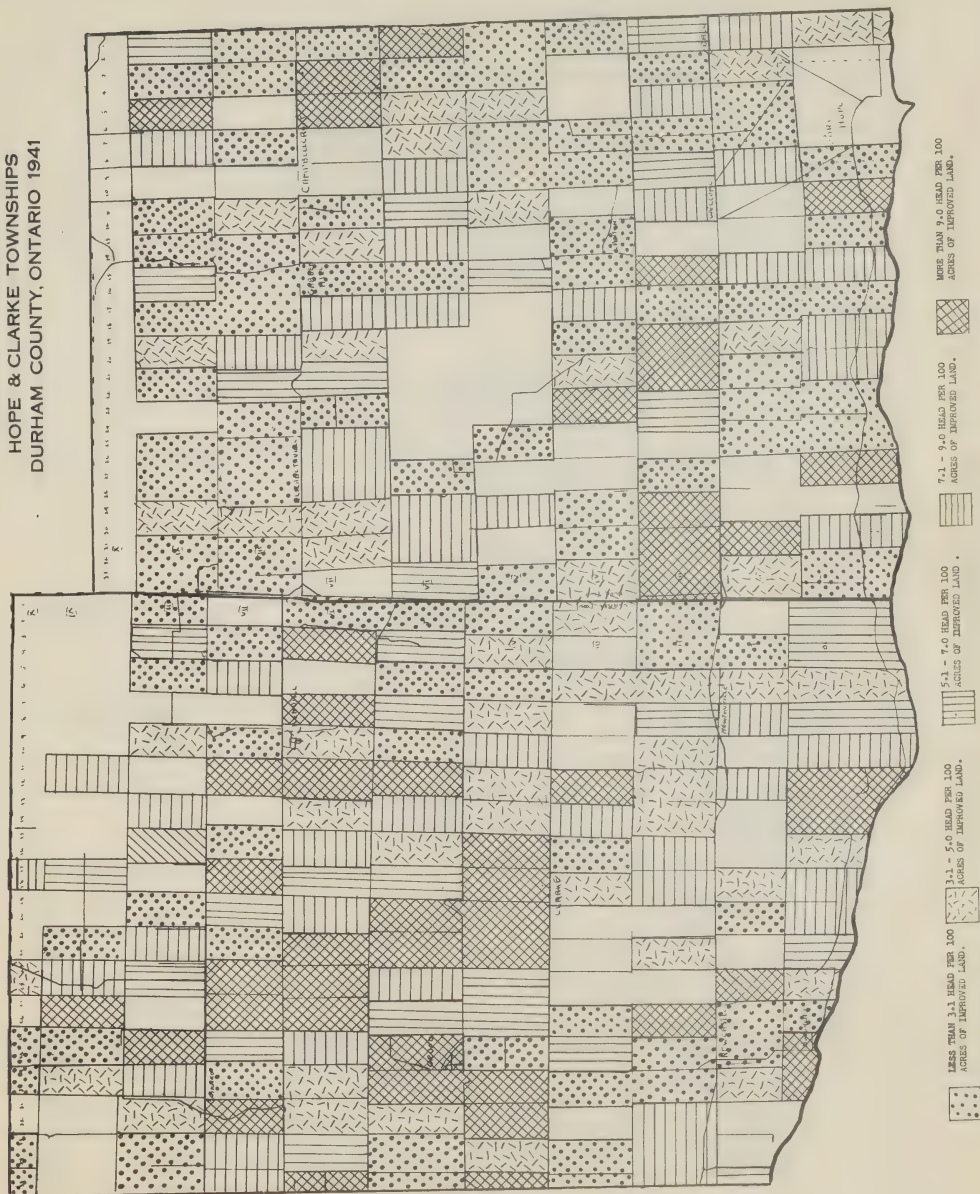


Fig. No. 15

**NUMBER OF MILK COWS
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941**

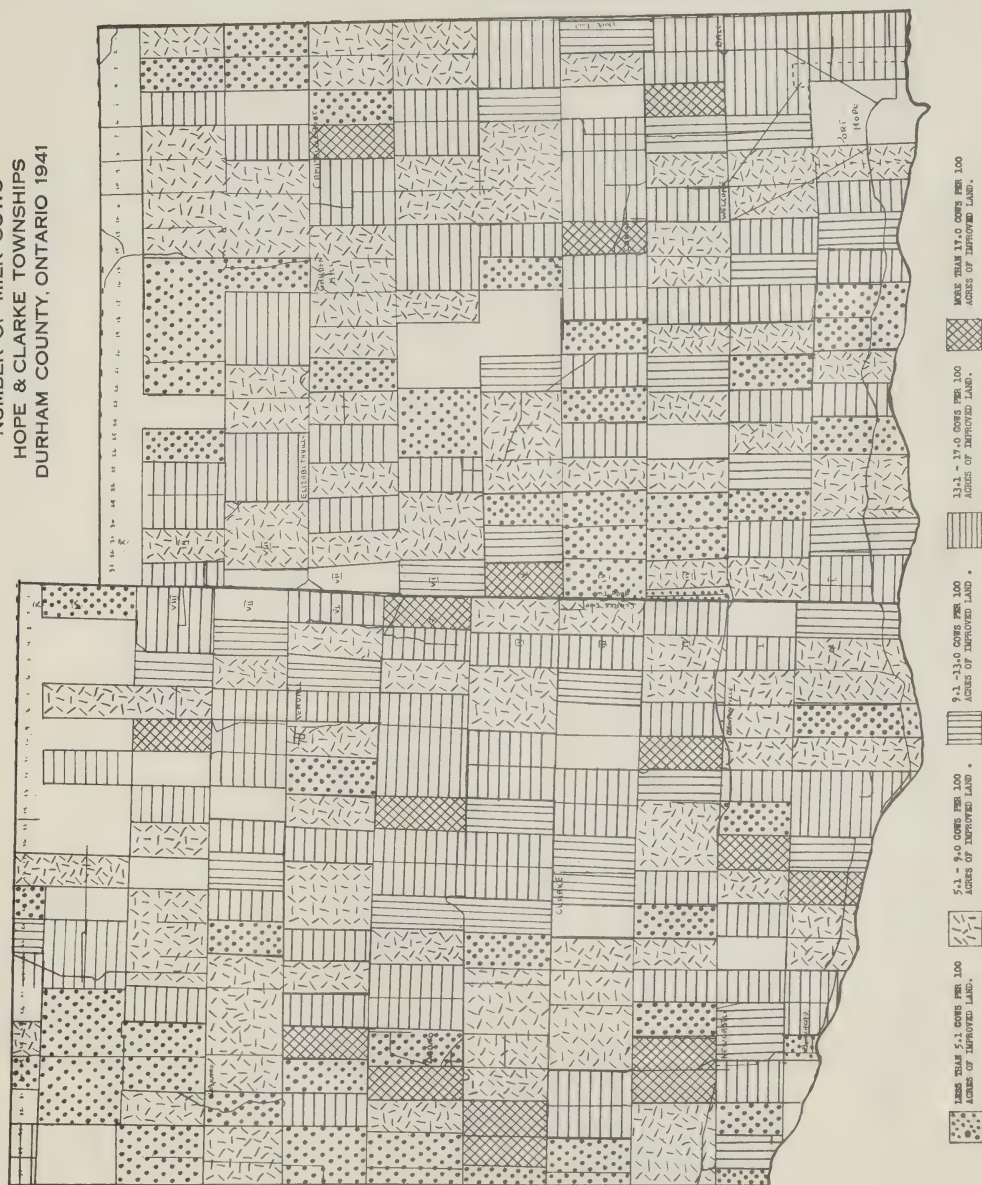


Fig. No. 16

**NUMBER OF SOWS
HOPE & CLARKE TOWNSHIPS
DURHAM COUNTY, ONTARIO 1941**

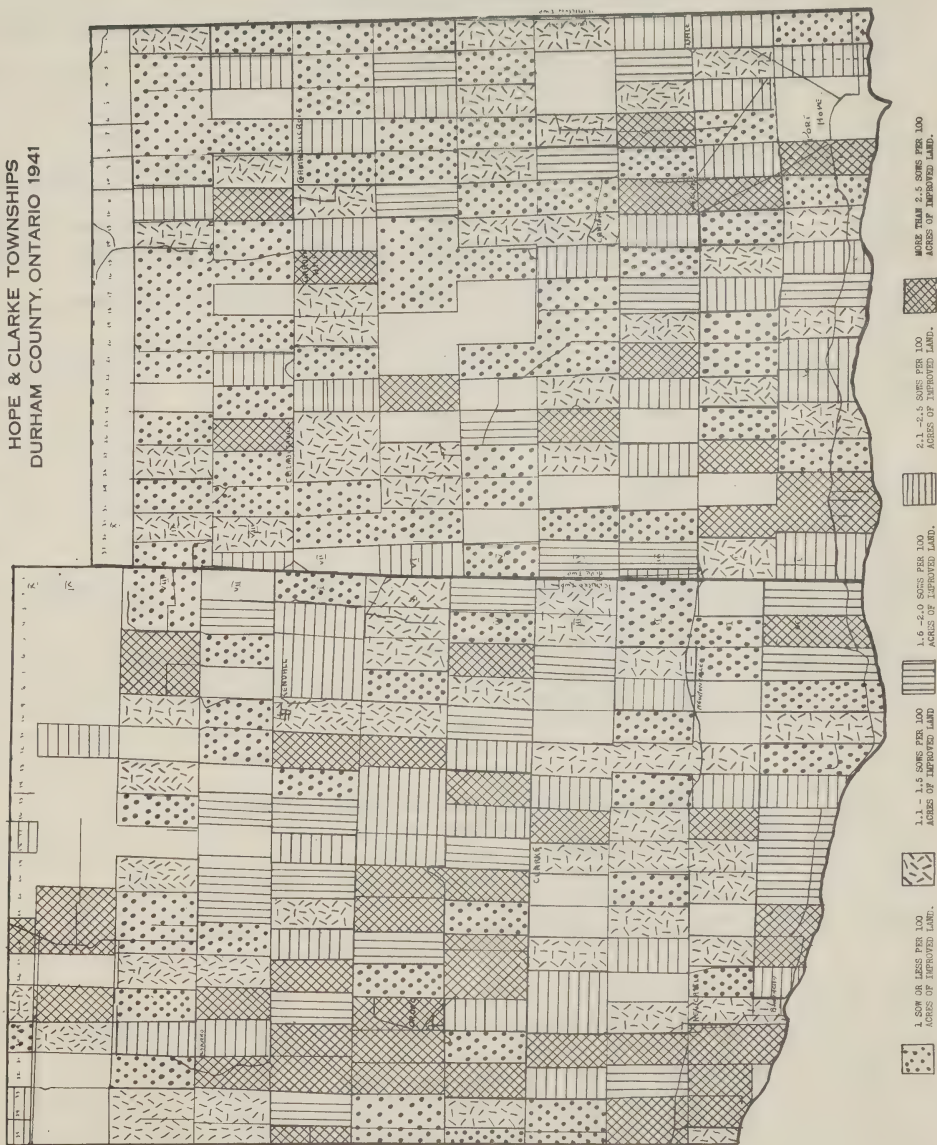


TABLE 30. Average Returns per Farm by Land Classes in Hope and Clarke Townships, 1940

	Land Class					All Classes
	I	II	III	IV	V	
Number of Farms	25	32	41	66	18	182
	\$	\$	\$	\$	\$	\$
1. Total cash receipts	674	837	1,061	1,599	2,153	1,272
2. Current expenditures	231	329	512	741	1,072	581
3. Capital expenditures	86	131	127	343	423	230
4. Total expenditures (2+3)	317	460	639	1,084	1,495	811
5. Net cash income (1 - 4)	357	377	422	515	658	461
6. Outside income	111	43	35	84	23	62
7. Cash income from farm (5 - 6)	246	334	387	431	635	399
8. Cash income from farm per 100 acres land	171	223	247	467	513	290

Livestock Sales. Total sales of livestock on farms located in lowest land class averaged \$320 per farm (Table 31), with sales of beef cattle and swine making up the greatest part of this total. The average sale of livestock on the 32 farms predominantly in Land Class II totalled \$446 with sales of beef cattle and hogs averaging \$309 per farm. Farms in Land Class III had livestock sales of \$624 per farm with sales of poultry making up 10 per cent of the total. Sales of hogs by farmers in this group made up about 45 per cent of their livestock receipts and averaged \$292 per farm.

Livestock sales on farms in Land Class IV totalled \$881 per farm of which \$668 were receipts from hogs and beef cattle. Poultry sales averaged only \$39 per farm, while returns from sales of calves and milk cows increased somewhat over farms on lower class land and totalled \$121 per farm. Livestock sales on the 18 farms in Land Class V increased slightly but sales from beef cattle and hogs decreased. Sales of milk cows and calves made up approximately one-quarter of the sales from livestock.

Livestock Products Sales. Receipts from livestock products increased steadily from an average of \$157 per farm on farms in Land Class I to \$930 per farm for farms in Land Class V. On Land Classes I to IV sales of cream and butter were most important while sales of eggs also made up a high percentage of total receipts. In Land Class V the returns from cream or butter made up only 13 per cent of total receipts from livestock products. On these farms, whole milk was most important and averaged \$611 per farm. Eggs were also of importance and averaged approximately 20 per cent of the total receipts of livestock products.

TABLE 31. Analysis of Average Receipts per Farm by Land Classes
in Hope and Clarke Townships, 1940

Receipts	Land Class				
	I	II	III	IV	V
<u>Livestock Sales</u>					
Horses	9	6	20	23	35
Milk cows	20	13	15	40	107
Calves	36	48	47	81	141
Other cattle	95	132	162	243	180
Swine	112	177	292	425	384
Sheep	14	44	26	27	50
Poultry	34	26	62	39	10
Other	-	-	-	3	-
Total Livestock	\$320	\$446	\$624	\$881	\$907
<u>Livestock Products</u>					
Whole milk	-	-	35	79	611
Cream or butter	95	142	196	211	121
Eggs	57	86	75	137	194
Wool	4	13	8	10	4
Honey	1	-	-	-	-
Total Livestock Products	\$157	\$241	\$314	\$437	\$930
<u>Crop Sales</u>					
Grain	5	28	40	66	65
Beans	3	-	4	12	-
Peas	16	4	17	13	17
Potatoes	25	21	11	17	2
Fruits and vegetables	11	45	5	79	191
Other	1	2	9	7	5
Total Crops	\$61	\$100	\$86	\$194	\$280
Forest products (including maple products)	26	7	2	3	23
Outside work	110	25	29	81	13
Boarders	-	18	6	3	-
GRAND TOTAL	\$674	\$837	\$1,061	\$1,599	\$2,153

Crop Sales. Crop sales made up approximately 10 per cent of total receipts in each land class group. Potatoes were the most important cash crop sales on farms in Land Class I and averaged \$25 per farm. Fruits and vegetables averaged \$45 per farm for Land Class II group while grain sales were most important on

Land Class III farms. Crop sales in Land Class IV were more diversified with fruit and vegetable sales averaging \$79 per farm and grain sales averaging \$66 per farm. On the 18 farms located predominantly on Land Class V land, fruits and vegetables were of first importance and averaged \$191 per farm, while grain sales totalled \$65 per farm.

Miscellaneous Receipts. Receipts from outside work on farms in Land Class I made up about 15 per cent of the total receipts indicating that the income from the farms did not provide adequate net returns. Sales of forest products averaged \$26 per farm for this group. Miscellaneous receipts on farms in the other land classes are not particularly significant.

TABLE 32. Percentage Receipts from Each Enterprise,
Hope and Clarke Townships, 1940

Receipts	Land Class				
	I	II	III	IV	V
	%	%	%	%	%
Livestock sales	47.5	53.3	58.8	55.1	42.1
Livestock products	23.3	28.8	29.6	27.4	43.2
Crop sales	9.0	11.9	8.1	12.1	13.0
Otherq	20.2	6.0	3.5	5.4	1.7
TOTAL	100.0	100.0	100.0	100.0	100.0

In most land class groups livestock sales were the most important source of income (Table 32), although farms in Land Class V reported that receipts from livestock products and livestock were of equal importance.

Expenditures. The average cash expenditures on the 182 farms in the two townships was \$811. Expenses increased from \$317 per farm on the lowest land class to \$1,495 per farm on Land Class V. An itemized breakdown of these expenses is shown in Table 33.

Expenditures reflect the type of farming carried on in each land class. In Land Class I only 14.7 per cent of total cash expenditures were charged for labour as against 20.7 per cent on farms in Land Class III and 22.9 per cent for Class V farms. Taxes on the other hand, totalled 18.2 per cent of the total in Class I and 14.5 per cent in the top class. In other words, on the better land class, a smaller percentage of the total expenditures were going into taxes while a higher percentage was being used to hire labour.

The farms in Land Class V averaged \$423 for capital expenditures or 31.1 per cent of total expenditures. This represented purchases of livestock, new equipment and new buildings. Farmers in Land Class III averaged capital expenditures of \$127 per farm, while those on Class I land totalled \$86 or 27.1 per cent of the \$317 expended.

TABLE 33. Average Expenditures per Farm by Land Class,
Hope and Clarke Townships, 1940

Expenditures	Land Class					All
	I	II	III	IV	V	Classes
Number of farms	25	32	41	66	18	182
	\$	\$	\$	\$	\$	\$
Labour - cash	21	37	70	127	252	96
- board	13	14	36	60	30	37
Total Labour	34	51	106	187	282	133
Taxes	42	46	88	101	139	84
Cash rent	17	44	11	30	11	24
Machinery repairs	19	20	48	38	67	37
Building repairs	14	11	29	36	33	27
Custom work hired	26	33	59	69	81	56
Feed and seed	43	66	82	170	166	110
Gas and oil	1	5	12	15	45	14
Manure and fertilizer	5	5	10	18	34	13
Binder twine	5	8	12	12	17	11
Miscellaneous	25	40	55	71	197	72
Total Current	231	329	512	747	1,072	581
Livestock purchased	62	80	74	219	270	146
New equipment	24	35	38	67	136	57
New buildings	-	17	15	51	17	27
Total Capital	86	132	127	337	423	230
Total Expenditures	317	461	639	1,084	1,495	811

TABLE 34. Average Percentage Distribution of Expenditures per Farm by
Land Class, Hope and Clarke Townships, 1940

Expenditures	Land Class					All
	I	II	III	IV	V	Classes
	%	%	%	%	%	%
Labour	10.7	11.1	16.6	17.3	19.2	16.4
Taxes	13.2	10.0	13.8	9.3	9.3	10.4
Feed and seed	13.5	14.3	12.9	15.6	11.1	13.6
Other current expenses	35.5	36.0	36.9	26.7	32.1	31.3
Total Current	72.9	71.4	80.2	68.9	71.7	71.7

(continued)

TABLE 34. (continued)

Expenditures	Land Class					All
	I	II	III	IV	V	Classes
	%	%	%	%	%	%
Livestock purchased	19.6	17.3	11.6	20.2	18.1	18.0
New equipment	7.5	7.6	5.9	6.2	9.1	7.0
New buildings	-	3.7	2.3	4.7	1.1	3.3
Total Capital	27.1	28.6	19.8	31.1	28.3	28.3
Total Expenditures	100.0	100.0	100.0	100.0	100.0	100.0

An analysis of livestock purchases by different land classes is shown in Table 35.

TABLE 35. Average Livestock Purchases Per Farm by Land Class, Hope and Clarke Townships, 1940

Purchases	Land Class					All
	I	II	III	IV	V	Classes
	\$	\$	\$	\$	\$	\$
Milk cows	2	10	9	24	94	22
Other cattle	16	18	38	104	130	65
Swine	3	6	7	44	12	20
Poultry	2	7	13	17	22	13
Horses	38	38	7	29	12	25
Other	1	1	-	1	-	1
TOTAL	62	80	74	219	270	146

Intensity of Farming in Each Land Class

In order to determine the intensity of the agriculture in each land class, man work unit standards were applied to the crops planted and the livestock raised in each land class. The resulting figures are summarized in Table 36 and show that as the land classes improve the number of productive man work units per farm increases. When the number of productive man work units per acre is compiled, the trend is even more significant and the number of man work units increases from 1.85 per acre on Land Class I to 4.09 on Land Class V.

These figures together with the index of cash income per acre on the various land classes bear out the classification as shown for land under review.

TABLE 36. Average Number of Productive Man Work Units per Acre and Net Cash Income per Acre by Land Classes in Hope and Clarke Townships, 1940

	Land Class					All
	I	II	III	IV	V	Classes
Number of farms	25	32	41	66	18	182
Man work units-crops	134.3	154.0	166.1	178.4	280.4	174.7
Man work units-livestock	131.3	152.3	194.0	216.5	226.0	215.0
Total Man Work Units	265.6	306.3	360.1	394.9	506.4	389.7
Total Acres	143.8	149.8	144.5	128.2	123.9	137.4
Man work units per acre	1.85	2.05	2.49	3.08	4.09	2.84
Index (average-100.0)	65.1	72.2	87.7	108.4	140.5	100.0
Net cash income from farm (Table 30)	\$ 246	334	387	431	635	399
Net cash income per acre	\$ 1.71	2.23	2.47	4.67	5.13	2.90
Index (average-100.0)	59.0	76.9	85.2	160.7	176.9	100.0

Summary of Farm Revenue

TABLE 37. Total Farm Revenue by Land Classes in Hope and Clarke Townships

	Land Class					All
	I	II	III	IV	V	Classes
Number of farms (estimate)	135	174	223	359	98	989(1)
Per cent	13.7	17.6	22.5	36.3	9.9	100.0
Total farm revenue 1940	\$ 95,657	153,107	248,747	601,803	221,816	1321,130(1)
Per cent	7.2	11.5	18.8	45.7	16.8	100.0
Total farm revenue per acre	\$ 4.92	5.87	7.72	13.11	18.27	9.73

(1) Agricultural Census, 1941. Dominion Bureau of Statistics.

The total farm revenue for all farms in Hope and Clarke Townships in 1940 was \$1,321,130. This included the value of produce consumed on farms as well as livestock and crop sales. A breakdown of this total for farms in the various land classes shows that 7.2 per cent of all farm revenue in the two townships was produced on 135 farms predominantly in Land Class I. The average return per acre of land on these farms was less than \$5.00 per acre as compared with \$5.87 on farms in Land Class II; \$13.11 and \$18.27 per acre on Land Class IV and V, respectively. This means that the 31.3 per cent of the farms in Land Class I and II produced only 18.7 per cent of the total revenue.

Type of Roads by Land Classes in 1942

One phase of this study dealt with type of roads in Hope and Clarke Townships. All roads in the two townships were traversed by car and were classified as one of six types. Roads which were used at one time but which were impassable in 1942 were classed as unused, while roads which were designated as through roads but could only be used by wagons were classified as wagon roads. Roads which could be travelled by car were classed as either (1) poor dirt or gravel, (2) good dirt, (3) good gravel or (4) provincial or county roads.

The mileage of each type of road in each land class was measured for both Hope and Clarke Townships and the total for the two townships was combined and shown in Table 38.

TABLE 38. Mileage of Different Type of Roads by Land Classes in Hope and Clarke Townships, 1942

Type of Road	Land Class					All Classes
	I	II	III	IV	V	
	(miles)					
Unused	17.0	4.8	4.6	3.5	-	29.9
Wagon	22.9	4.0	5.0	7.0	.3	39.2
Poor dirt or gravel	42.9	24.8	24.4	17.3	5.8	115.2
Good dirt	52.1	22.9	31.6	35.8	7.4	149.8
Good gravel	25.6	9.9	16.1	33.3	9.5	94.4
Province or county road	14.1	12.3	11.7	22.8	7.4	68.3
TOTAL	174.6	78.7	93.4	119.7	30.4	496.8

In the two townships there were 496.8 miles of road including 29.9 miles that were not usable in 1942 and 39.2 miles that could only be used as wagon roads. The total mileage of usable road in each land class related to actual acreage in each land class shows that for Land Class I there were 2.3 miles of road for each 1,000 acres (Table 39).

TABLE 39. Mileage of Usable Road Related to Acreage in Each Land Class, Hope and Clarke Townships, 1942

	Land Class					All Classes
	I	II	III	IV	V	
	(miles)					
Mileage of usable road	134.7	69.9	83.8	109.2	30.1	427.7
Acreage	58,200	20,000	24,000	27,700	8,900	138,000
Mileage of usable road per 1,000 acres of land	2.3	3.5	3.5	3.9	3.4	3.1

It may be noted that as the land class improves, the number of miles of usable roads per 1,000 acres of land also increased, although there is a slight decrease in Land Class V probably due to the fact that there is only a small percentage of land in this land class.

In Land Class I, 47.4 per cent of the roads were classed as poor dirt or gravel, wagon or unused (Table 40). This compared with 42.7 per cent in Land Class II, 36.4 per cent in Land Class III, 23.3 per cent in Land Class IV and 20.1 per cent in Land Class V. There is a close relationship between productivity of land as reflected in the various land classes, and the condition of roads; the better land and the better roads go together.

TABLE 40. Percentage of Each Road Type in Different Land Classes, Hope and Clarke Townships, 1942

Type of Road	Land Class					All Classes
	I	II	III	IV	V	
Unused	9.7	6.1	4.9	2.9	-	6.0
Wagon	13.1	5.1	5.4	5.8	1.0	7.9
Poor dirt or gravel	24.6	31.5	26.1	14.6	19.1	23.2
Good dirt	29.8	29.1	33.8	29.9	24.3	30.2
Good gravel	14.7	12.6	17.3	27.8	31.3	19.0
County or province	8.1	15.6	12.5	19.0	24.3	13.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Education Costs Related to Land Classes in Hope and Clarke Townships

Information was obtained from W. H. Carlton ^{1/}, Cobourg, with respect to all aspects of public schools in Hope and Clarke Townships and an attempt has been made to analyse these data to determine which factors are most important and if possible, to relate expenditures and disbursements to size of farm and, if possible, to land classes.

Clarke Township. In 1941 there were 18 school sections in Clarke Township. Seventeen of these had one-room schools, while the other had a three-room school located in Orono. The majority of these schools were of brick construction, although six were frame and one was cement. The average valuation of the one-room schools including land was \$2,400. The average attendance of the 17 one-room schools was 13.9 students.

Hope Township. Of the 18 school sections in Hope Township in 1941, 16 had one-room schools, while one had a two-room school. One school section in Hope had closed its school because of the small number of students and arrangements had been made for transportation of the few pupils living in the section to schools in other sections. Thirteen of the schools were of brick construction

^{1/} Public School Inspector, Northumberland and Durham County, Ontario.

while four were frame and one was stone. The average value of the land and the 18 school buildings in the township is shown at slightly more than \$2,500. The average attendance for the one-room schools was 13.8 students.

Financial Standing. Receipts and expenditures of school sections in Hope and Clarke Townships in 1941 are itemized in Table 41.

TABLE 41. Receipts and Expenditures, All School Sections in Hope and Clarke Townships, Durham County, 1941

	Hope			Clarke			Total		
	\$	%		\$	%		\$	%	
<u>Receipts.</u>									
Provincial grant	3,041.19	15.3		3,353.12	15.3		6,394.31	15.3	
County grant	687.13	3.5		480.48	2.2		1,167.61	2.8	
Township grant	10,600.00	53.3		11,600.00	53.0		22,200.00	53.1	
Section taxes	4,683.86	23.5		6,208.38	28.4		10,892.24	26.1	
Other revenue	881.14	4.4		231.79	1.1		1,112.93	2.7	
Total Revenue	19,893.32	100.0		21,873.77	100.0		41,767.09	100.0	
Balance on hand at beginning of year	10,882.34			20,244.95			31,127.29		
TOTAL	30,775.66			42,118.72			72,894.38		
<u>Expenditures.</u>									
Instruction	13,587.95	69.7		15,484.52	72.8		29,072.47	71.3	
Supplies	648.81	3.3		785.35	3.7		1,434.16	3.5	
Administration	336.45	1.7		392.91	1.8		729.36	1.8	
School operating	2,462.12	12.7		3,180.98	14.9		5,643.10	13.8	
Maintenance	1,036.19	5.3		1,122.96	5.3		2,159.15	5.3	
Auxiliary	332.67	1.7		160.34	.7		493.01	1.2	
Capital outlay	1,093.89	5.6		162.45	.8		1,256.34	3.1	
Total Expenditures	19,498.08	100.0		21,289.51	100.0		40,787.59	100.0	
Balance on hand at beginning of year	11,277.58			20,829.21			32,106.79		
TOTAL	30,775.66			42,118.72			72,894.38		

It may be noted that the receipts and expenditures of school sections in Hope and Clarke Townships parallel each other very closely. School sections in both townships received 15.3 per cent of their total revenue from the province and 53 per cent from the township. The amount assessed and collected by the school sections, however, made up 28.4 per cent of total receipts in Clarke as compared with 23.5 per cent in Hope.

Expenditures were also similar; the main difference being capital expenditures. Hope school sections spent \$1,094 or 5.6 per cent of the total expenditures on capital investment, while Clarke totalled only \$162 or 0.8 per cent.

Expenditure per Student Related to Average School Attendance. The average expenditure per student in all one-room schools in the two townships averaged \$75.55 per year.

As would be expected the average attendance had a very definite influence on the cost per student. A breakdown of costs per school section in relation to the average attendance is shown in Table 42.

TABLE 42. Attendance per School Related to Expenditures per Pupil,
Hope and Clarke Townships, Durham County, 1941

Average Attendance	: Number of school sections	: Number of students	: Total Expenditure	: Expenditure per student
	no.	no.	\$	\$
Under 10	7	55.65	6,463.38	116.14
10 - 14.9	13	162.85	13,669.86	83.94
15 - 19.9	10	166.97	10,908.43	65.33
20 and over	3	72.26	3,543.98	49.04
Total and average	33	457.73	34,585.65	75.55

It is significant that the schools averaging more than 20 students per school had an expenditure of \$49.04 per student. This increased as the average attendance decreased until in schools where the average attendance was less than 10, the cost per student was \$116.14 per year.

Expenditure per Student Related to Land Class. Each school section was charted on a land class map and an estimate was made of the amount and percentage of each land class in the different school sections. The school sections were then divided on the basis of their predominant land class and an analysis made of expenditures and other factors.

The land class in the different school sections can be related to the expenditure per student (Table 43) but other factors, such as average attendance per school tend to influence any statistical correlation. Figures presented show that school sections with some land in the submarginal Land Class I or II had the highest cost per student (Groups 1, 3 and 6), but these were also the groups that had the smallest average attendance per school. The lowest expenditure reported was \$60 per student for those school sections in group 4 (Land predominantly in Land Class III) but it is again significant that the average attendance of schools in this group was 16 students, the second largest of the 8 groups that were classified.

The size of school section was not apparently influenced by land class and the average size as reported for the various land class groups ranged from a high of 4,100 acres for those 5 school sections predominantly in Land Class I to 3,100 acres for 8 school sections predominantly in Land Class II.

TABLE 43. Predominant Land Classes in School Sections Related to Expenditure per Student,
Hope and Clarke Townships, 1941

Group No.	Land Class	Number of School Sections	Average Number of Students	Average Expenditure per Student	Average Capital per Student	Average Area per Student	Average Size of School Section	Per cent of No. I Teacher's Salary
		no.	no.	\$	\$	acres	acres	%
<u>Predominant Other Land</u>								
1	I	5	11.0	85	146	373	4,100	60
2	I	8	13.1	74	160	295	3,875	75
3	II	3	10.0	111	184	309	3,100	--
4	III	3	16.0	60	241	235	3,750	100
5	III	2	15.0	64	249	241	3,625	100
6	IV	3	12.5	87	145	270	3,375	100
7	IV	5	13.8	81	220	251	3,450	80
8	V	2	19.1	68	157	209	4,000	100
9	Unclassified	2	22.4	48	114	199	4,575	100

From the analysis shown in Table 43, it would seem evident, however, that as the land classes in the school section improve, the average area per student decreases. That is to say, the average area per student for school sections predominantly in Land Class I, was 373 acres while school sections on the best class of land averaged only 209 acres per student. This would mean that students in the poorer land would have further to go to school and the trend would be to either enlarge the area in order to provide continuing school facilities or to close the school section when the number of students drops to such an extent that the expenditure per student is too high. This had already happened in 1941 in one school section in Hope Township; the school was closed and arrangements made to transport a few students to neighbouring schools in other sections.

Relationship of Receipts and Expenditures by School Sections. As land classes set up were based on the productivity of land, it is to be expected that farms in the two submarginal classes could not be expected to carry their full share of costs as compared with farms located on the better land classes. When the school sections were grouped on the basis of land classes and the total taxes (not including local school section taxes) received from each section were related to total expenditures for each school section, some important facts were revealed. (Table 44)

TABLE 44. Predominant Land Classification of School Sections Related to Taxes Paid and Education Grants Received from Townships of Hope and Clarke, Durham County, 1941

Group			Township		% Taxes paid
No.	Land Class	Assessment:	Taxes including	Township Grants to S. S.	returned for Education to S. S.
		\$	\$	\$	\$
(000 omitted)					
	<u>Predominant</u>	<u>Other Land</u>			
1	I	II	294.5	2,837.81	3,000.00 105.7
2	I	III or IV	647.2	4,801.24	4,800.00 100.0
3	II	I	231.7	2,323.10	1,800.00 77.5
4	III	I	293.0	2,777.90	1,800.00 64.8
5	III	IV or V	256.1	2,227.41	1,200.00 53.9
6	IV	I & II	297.8	2,765.54	1,800.00 64.9
7	IV	III or V	785.1	6,286.31	3,000.00 47.7
8	V		355.7	3,170.05	1,200.00 37.9
9	Unclassified		326.1	2,733.01	1,200.00 43.9
Average or Total			3,487.2	29,922.37	19,800.00 66.2

Township taxes, including general school taxes paid by farmers in the 33 one-room school sections in Hope and Clarke Townships, totalled \$29,922 in 1941. Of this total, \$19,800 or 66 per cent was paid back to the school sections as township grants. School sections predominantly in Land Class I with some land in Class II (Group 1 in Table 44) paid \$2,838 in township taxes

and received \$3,000 from the township for education alone or 5.7 per cent more than the total paid in. On the same basis, school sections predominantly in Land Class I with some land in Land Class III or V (Group 2) were allocated \$4,800 for education out of total taxes of \$4,801 paid in. The education grants to school sections in group 3 amounted to 77.5 per cent of the taxes paid by owners of land in this school section. The three groups with the largest part of the section on Land Classes I and II were not able to pay their way for education grants and the other school sections had to provide compensation for their inability to pay education costs. Group 8 or school sections in Land Class V paid \$3,170 in township taxes and only 38 per cent of this amount was returned to these school sections for educational purposes.

Alternative Uses of Land in Hope and Clarke Townships

The "Ganaraska Watershed" report referred to in the introduction of this report on Land Use recommends that approximately 20,000 acres in the northern part of the Ganaraska Valley be established as a forest area. In addition to flood control, soil erosion and other aspects that influenced the decision to place this area in forest, there are certain other economic conditions that have been brought out in this report on Land Use that support such a procedure. In fact, information presented in this survey would indicate that the "Ganaraska Forest Area" might be extended to other sections of Hope and Clarke Townships.

The information on the revenue capacity of farms in the various land classes in these two townships indicates that in 1940 the revenue produced on farms in Land Class I was about \$4.92 per acre and Class II farms, \$5.87 per acre as compared with \$18.27 for farms in Land Class V. This means that 31.3 per cent of the farms in the two townships classified in Land Class I or Land Class II produced only 18.7 per cent of the total revenue despite the fact that a part of the land in farms of these classes was of a higher category. It is plain from this study that farms in the submarginal groups are not able to bear their share of the cost of such public services as roads, schools, etc. The taxes paid by farmers in Land Classes I and II averaged \$42 and \$44 respectively, compared with \$139 for Land Class V and \$84 for all farms. While farms in these two groups make up almost one-third (31.3 per cent) of the total number of farms in the two townships, they contribute less than 16 per cent of the taxes paid.

While it is difficult to compare the productive value of farm land with returns that such land would yield from the production of forest products because of limited information on the latter aspect, there is some evidence that land such as that listed as Class I in this report and possibly a good deal of that included in Class II would yield greater returns over a period of time if devoted to forest production. The returns from the utilization of such land in recreational facilities are still more difficult to measure. With changing conditions in both urban and rural life, however, there is need for the retention or development of areas suitable for recreational purposes and a good deal of land that is now submarginal for agricultural production might well be considered for such purposes.

SUMMARY AND CONCLUSIONS

The Ganaraska River Valley in Durham County presents many problems that are thought to be characteristic of other areas in Eastern Canada. This study of land use is the first attempt undertaken in Eastern Canada to classify land on the basis of productivity and use capabilities and as a result it was found that many new techniques had to be worked out.

The population of Durham County increased from 3,546 in 1825 to a peak of 39,115 in 1861, but since then has declined steadily to 25,215 in 1941,

In 1941, 1,200 fewer farms were reported in Durham County than were shown at the time of 1881 census. During the same period improved land in the county decreased from 274,000 to 238,000 acres. In Hope and Clarke Townships crop land decreased from 76,311 acres to 55,786 acres between 1911 and 1941 while forest land during this same period increased from 11,696 acres to 14,352 acres.

Cropping practises in this area have shown significant changes since 1861. Wheat acreage was reduced by 80 per cent while oats and mixed grains acreages increased almost threefold. Production of barley was important in the late nineteenth century but in 1941 the total acreage planted was only about 12 per cent of the 1891 acreage. Beans and peas were a very important crop from 1860 to 1900 but by 1941 the acreage had been reduced from 13,700 acres to approximately 2,200 acres. Corn for husking showed a similar trend and decreased from 1,445 acres in 1901 to 43 acres in 1941. Production of hay increased considerably in the area due to increased yields and increased acreage.

Changes in livestock production between 1860 and 1940 were not as significant as those reported for crops.

Farms in the Ganaraska Valley between 1940 and 1942 averaged 168.8 acres, of which 63.9 per cent was improved land and 45.9 per cent was cropped.

Sales of livestock and livestock products provided the main source of income for farmers living in the Watershed and made up more than 80 per cent of total income.

In 1941 the average capitalization of 257 farms from which records were obtained was \$8,225 or \$48.72 per acre. This included value of land, buildings, livestock, and equipment.

The total assessed value of land and buildings in Hope and Clarke Townships in 1941 was more than 4 million dollars or approximately \$18.50 per acre.

The average net cash income of the 257 farms included in the survey was \$530; average receipts totalled \$1,266, while expenses per farm averaged \$736. On 49 farms in the forest area net cash income was \$444 as compared with \$550 outside the forest area.

An analysis of living costs in typical farms in the area shows that the average level of living of 33 families in the forest area is low and for a good many of the individual farms the level is so low that insufficient necessities are obtained and almost nothing in the way of advancement and recreation, which are considered as part of the Canadian standards of living. While living expenditures on farms outside the forest area were 30 per cent higher than those within the forest area, the high percentage spent on necessities would indicate that the pressure of living is almost as great on the average farms in the Ganaraska Watershed as it is in the forest area.

Approximately 14 per cent of the farms in the Ganaraska Watershed reported expenditures higher than receipts while 17 per cent of the farms reported net cash incomes of more than \$1,000 per year. In the forest area 8.2 per cent of the farms reported an income of more than \$1,000 as compared with 18.8 per cent in the main area.

There are some sections of the Ganaraska Watershed where the productivity of the land is still good and farming is profitable but the low level of production on many farms reduced the average for the whole area to marginal limits.

Hope and Clarke Townships were mapped into land classes on the basis of productivity and use capability. Land classes in this area ranged from Land Class I which was defined as submarginal from the point of view of general farming and would be adaptable only to forest growth with some permanent pasture, to Land Class IV and V which are supermarginal and suitable for general farming, as carried on in the area.

In the two townships it was estimated that approximately 42 per cent of the 138,800 acres was Land Class I, while only 8,900 acres could be classed in Land Class V.

An analysis of farms in the different land classes shows the type of farm business that is carried on in each class. The farm cash income per one hundred acres of land varied from \$246 in Land Class I to \$635 in Land Class V.

Total farm revenue per acre in Hope and Clarke Townships averaged \$9.73 per acre but varied from \$4.92 per acre on farms in Land Class I to \$18.27 on farms in Land Class V. From the point of view of returns either in monetary results or in human welfare, it would seem that land predominantly in Land Class I and probably some of that located in Land Class II should be used for reforestation or recreational purposes.

Education costs were related very closely to Land Classes. From an analysis of school assessments and receipts, it was evident that school sections predominantly in Land Classes I and II spent more than they contributed in taxes. The people on land in the better classes had to compensate inability to pay for education in the lower land classes.

An analysis of living plants in this area shows that the average level of living plants in the forest area is low and the most many of the individual plants are small. The average level of living plants in the forest area is low and the most many of the individual plants are small. The average level of living plants in the forest area is low and the most many of the individual plants are small.

Approximately 1000 plants of the forest area are reported. The average level of living plants in the forest area is low and the most many of the individual plants are small. The average level of living plants in the forest area is low and the most many of the individual plants are small.

There are also sections of the forest area where the living plants are small. The average level of living plants in the forest area is low and the most many of the individual plants are small. The average level of living plants in the forest area is low and the most many of the individual plants are small.

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